egnite

Querx WLAN

Wireless Thermometer / Hygrometer and Data Logger

Querx WLAN TH
Querx WLAN PT100
Querx WLAN PT1000

User manual

PRELIMINARY

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1 Introduction

Querx WLAN is a networking enabled measuring device for acquiring room climate or only temperature values, depending on the model. This manual covers configuration, operation and maintenance.

Querx WLAN online resources

Further information can be found on the websites http://www.egnite.de and http://sensors.egnite.de.

1.1 Safety instructions

Please read this manual carefully and follow security instructions below to minimize the risk of injury and damage.

Intended use

Querx WLAN is used to acquire and process environmental parameters at a fixed place, and provide this data over several digital interfaces.

Every other use of the device is regarded as not intended. The manufacturer can not be held responsible for consequences from unintended use.

Risk for life by electric current

To avoid accidents with electric current, please follow these instructions:

- Only use device, cable and power adapter in proper condition!
- Disconnect the device from the power supply before maintenance!
- Do not modify the device or its accessories!
- Let only qualified staff members repair the device!
- Do not immerse the device in water or other liquids!

1.2 Explanation of symbols

Within this manual, following symbols are used:

Danger

This symbol indicates danger of injury

Attention

This symbol indicates a risk, that may lead to the damage of the device

Information

This symbol emphasizes useful hints and background information.

1.3 About Querx WLAN

Querx WLAN acquires environmental parameters and provides them over network interfaces. The alert function sends notifications over email (TLS / StartTLS), SNMP trap and Syslog message if critical thresholds are exceeded.

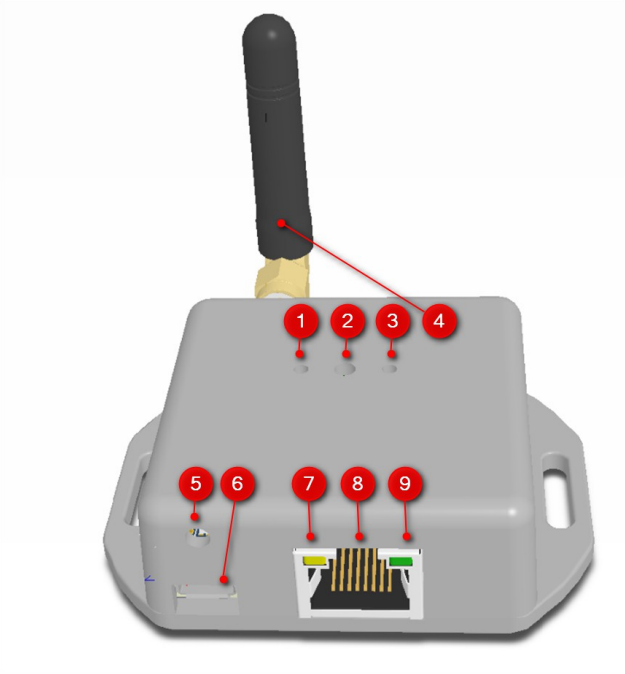
The internal memory can record at least 7.5 years of sensor data. The measurement results are displayed as interactive chart in the web interface. Alternatively, you can manually export the data in several formats or request them over a HTTP interface.

Cloud connectivity brings Querx WLAN into the Internet of Things and allows world wide data access over web and app.

SNMP connects Querx WLAN to network management solutions, using Modbus/TCP it is easy to employ the unit in industrial process management systems (SCADA).

Furthermore, status, error and alert messages can be sent to a syslog server.

1.3.1 Querx WLAN at a glance



(1) Push button (currently without function)

(2) Status LED

(3) Push button for configuration resets

(4) WLAN antenna

(5) Sensing cable

(6) Micro-USB jack for power supply

(7) Ethernet link LED

(8) RJ 45 jack for Ethernet

(9) LED for Network activity

1.3.2 Features

- Stand-alone device. No additional computer or software is needed
- Alert notifications over email, SNMP trap and syslog
- Data logger with a capacity of 4 million records = 7.5 years
- Data export as CSV, JSON and XML
- Manifold interfaces for accessing currently measured and recorded data
- Encrypted email communication (StartTLS / TLS)
- Cloud connectivity for world wide data access

- Small dimensions

1.3.3 Possible fields of application

- Server room monitoring
- Pharmacies
- Hospitals
- Food hygiene
- Estate monitoring
- Automated climate profiles for buildings
- Preventive conservation in museums, archives and depots
- Cause determination for mold remediation.

1.3.4 Included in delivery

Querx WLAN TH Set (Item EGN601015)

- Querx WLAN TH with temperature and humidity sensor
- WLAN antenna
- Ethernet cable
- MicroUSB cable
- USB power adapter with interchangeable clippings for UK, EU, USA and AU
- CD with software and documentation

Querx WLAN TH (Item EGN601115)

- Querx WLAN TH with temperature and humidity sensor

Querx WLAN PT100 Set (Item EGN601315)

- Querx WLAN PT100 with test sensor
- WLAN antenna
- Ethernet cable
- Micro USB cable
- USB power adapter with interchangeable clippings for UK, EU, USA and AU
- CD with software and documentation

Querx WLAN PT100 (Item EGN601415)

- Querx WLAN PT100 with test sensor

Querx WLAN PT1000 Set (Item EGN601615)

- Querx WLAN PT1000 with test sensor
- WLAN antenna
- Ethernet cable
- Micro USB cable

- USB power adapter with interchangeable clippings for UK, EU, USA and AU
- CD with software and documentation

Querx WLAN PT1000 (Item EGN60715)

- Querx WLAN PT1000 with test sensor

1.3.5 Spare parts and accessories

Following accessories and spare parts can purchased from the manufacturer:

- Ethernet cable
- WLAN antenna
- MicroUSB cable
- USB power adapter with interchangable clippings for EU, UK, US and AU
- CD with software and documentation
- DakkS calibration certificate

On http://shop.egnite.de you can find a selection of Pt100 and Pt1000 temperature probes, which can be used with Querx WLAN PT100 or Querx WLANPT1000.

2 Putting into operation

2.1 Preparation

If the temperature of the device differs from the ambient temperature, please allow it to acclimate.

Wait for two hours before you connect the unit to the power supply.

	Attention Temperature differences between device and its environment can cause condensation and damage the device.

	Information Temperature differences between humidity sensor and environment can cause measurement errors

2.2 Mounting

Querx WLAN can be wall-mounted using the lashes of the enclosing. Alternatively, you can use cable stripes to attach the unit to tubes.

Please pay attention to following instructions:

- Querx WLAN is suitable for indoor applications.
- Do not install the unit in places directly exposed to sunlight.
- **Querx WLAN TH:** Please ensure that the humidity probe is exposed to sufficient but not too strong air circulation. Measurements in stagnant air are possible, but can cause measurement errors.
- The unit can be installed in 3 dimensions:
  - sensing cable points left
  - sensing cable points right
  - sensing cable points to the bottom

Please do not install Querx TH with the sensing cable pointing to the top.

2.3 Network connection

1. Using the provided Ethernet cable, connect Querx WLAN to a network or directly to the computer from which you want to configure the device.

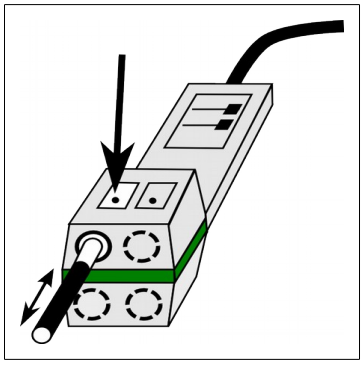
2.4 Connecting the probe

Querx WLAN PT100 / PT1000 supports any 2-, 3- and 4-wire Pt100 / Pt1000 probes.

To connect a probe you will need:

- A tool with a fine tip, such as a watchmaker's screwdriver or tweezers
- A ballpoint pen
- Maybe a magnifying glass

2.4.1 Connecting a single wire



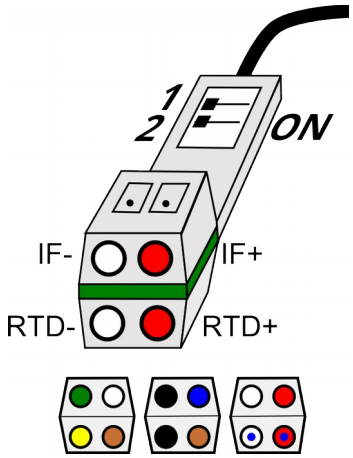
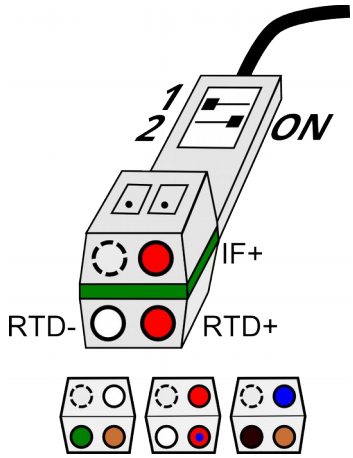
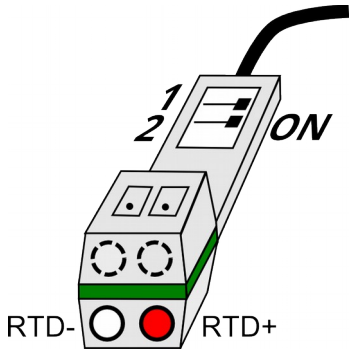
1. Push the button above the clip, into which you want to insert the wire with a ball-point pen.
2. Insert the wire.
3. Release the button.
4. Check if the clip has locked by gently pulling the wire.
5. To release a wire, press the button again and pull the wire out of the clip.

2.4.2 Sensor connection and configuration

Above the clips for the sensor wires, you find two DIP switches, over which you configure the type of sensor you intend to use.

1. Look up the switch configuration for your particular probe in the following image.
2. Use a tool with a fine tip to set the switches the corresponding configuration. If needed, use the magnifying glass.

3. Insert the single wires into the clips according to the following image.

		
4-wire probe	3-wire probe	2-wire probe

Information

Depending on the applied production standard, the color encoding for you sensor might differ from the examples in the image. In this case please consult the manufacturer's data sheet.

2.5 Power supply

1. Prepare the wall plug adapter by gently pushing the clipping for your country into the guide rails from above, until it locks in place.

2. Now connect the wall plug adapter to the device, using the provided micro USB cable.
3. Put the adapter into the wall outlet. Querx WLAN's status LED lights yellow.

Danger

Never use the device with a damages adapter. There is a risk for live caused by electrical current.

If you do not have a free wall outlet, you can directly connect Querx WLAN to the free USB port of a computer.

2.6 Network configuration over DHCP

Over DHCP, Querx WLAN can obtain an automatic network configuration. If valid settings are received, the status LED lights green.

If a network error has occurred, Querx WLAN blinks yellow. In this case, check whether the network cable is connected properly. If the problems remain, ask your network administrator for advice.

2.7 Manual network configuration

To manually configure Querx WLAN, you first need to establish a connection to the device. This initial connection is usually configured automatically and afterward you will be able to access its web interface following the instructions in chapter 3 Accessing the web interface.

If your network does not support DHCP and the computer from which you want to configure the unit does not support mDNS (e.g. if you are using Windows XP), you have to set up the initial network configuration manually.

Information

Most users don't need to perform the following steps. Please continue with chapter 3 Accessing the web interface.

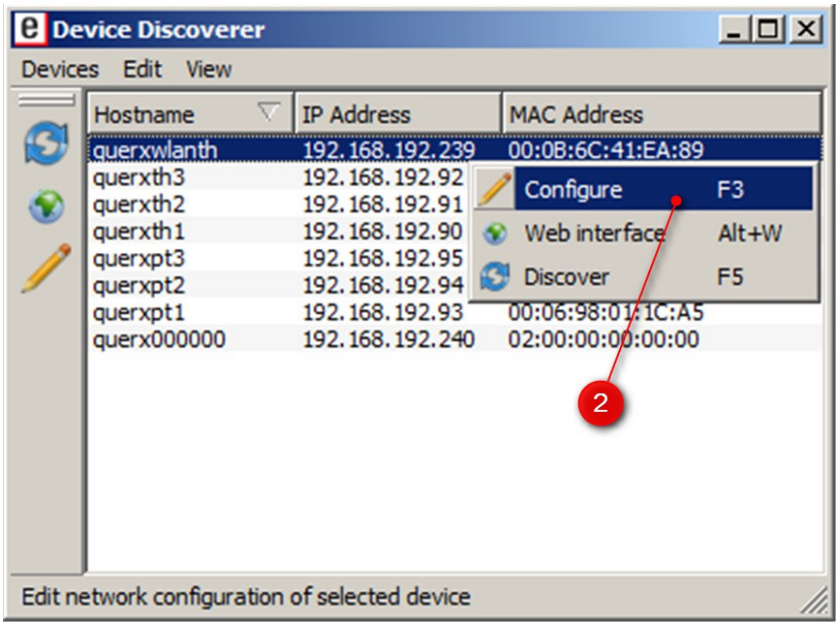
2.7.1 Installation of Device Discoverer

On the supplied CD-ROM you will find the application **Device Discoverer**, which allows remote configuration of Querx WLAN.

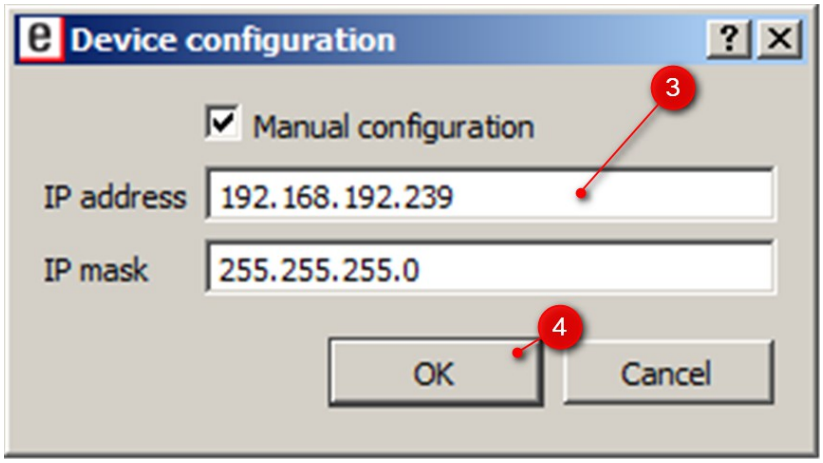
1. Start the installation software for **Device Discoverer**.
2. Follow the instructions of the installation wizard.

2.7.2 Assign network configuration

1. Start the application *Device Discoverer*.



2. Right-click on the device, which you want to configure, and choose *Device configuration*.



3. Enter an *IP address* and a *network mask.*
4. *Click the OK button.*

Querx WLAN will restart with the new configuration. The status LED lights yellow. As soon as the device is available, the status LED blinks green.

3 Accessing the web interface

3.1 Host name

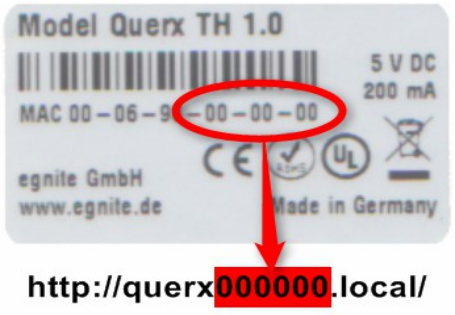
Access via host name

With mDNS, you can directly access Querx WLAN over its system name in the local network. This name can be configured in the configuration back end.

1. Open a web browser and enter the following URL in the address bar:

   http://<systemname>.local/

   Per default, this system name is querx00000, where you have to replace the six 0s with the last six characters of the device's MAC address. This address can be found on the sticker at the bottom side of the unit.



   For the example image above, the address is:

   http://querx000000.local./

⚠	**Information** If you have changed the IP address of the device, you might need to clear the DNS cache of windows. To do so, enter the following into the input prompt: `ipconfig /flushdns`

Access over Bonjour

From the Safari web browser, you can also access Querx WLAN over the Bonjour menu.

Information

If you cannot access the web interface, you need to manually set a network configuration. How to do this is discussed in chapter 2.7 Manual network configuration.

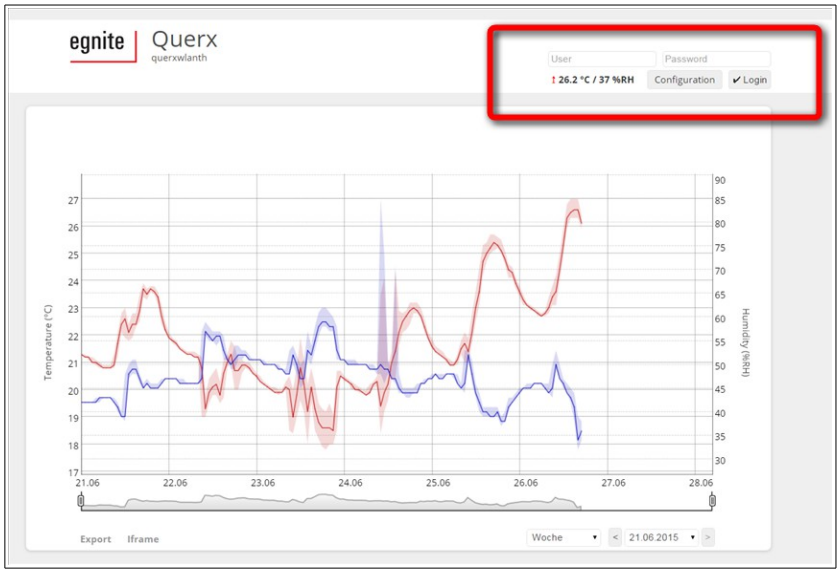
3.2 Home page

On Querx WLANS's homepage, you will find the recorded data in an interactive chart. In the chapters 7 Data access and 6 Configuration of Interfaces you will learn how to use display and export functions.

In the upper part of the homepage, you find some buttons to log in at Querx WLAN and to open the configuration back end.

3.3 Log in

If you have configured users and assigned them access rights, you need to log in at Querx WLAN.



1. Enter your user name in the field *User,* your password in the field *Password*.
2. Click on *Login.*

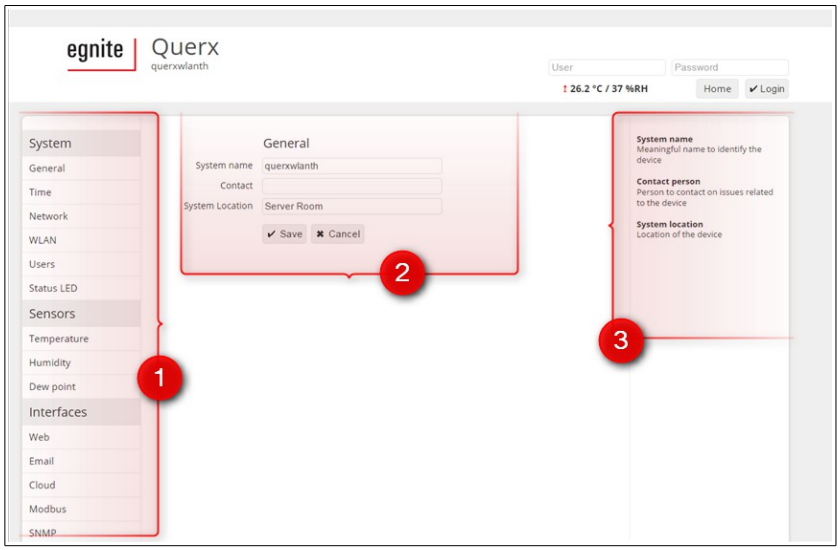
In Querx WLANS's default configuration, no users are configured. You can learn more on user management in chapter 4.3 User Management.

3.4 Accessing the configuration back end

1. To access the configuration back end, click on the *Configuration* button in the upper right corner of the homepage.

3.5 Overview on the configuration back end

You now see the configuration back end.



1. **Configuration menu**
   Here you can navigate to configuration options.
2. **Settings**
   In this section, you change the configuration.
3. **Online help**
   On the right side of the screen, you find short explanations for the several configuration options.

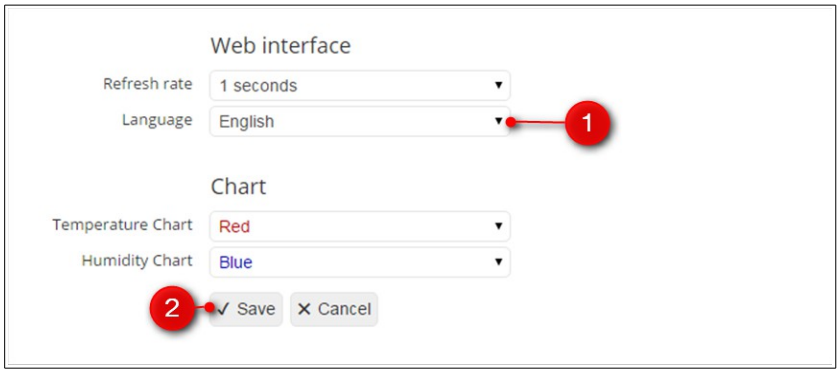
4 Basic configuration

4.1 General settings

For proper operation, the following configuration steps need to be performed.

4.1.1 Select language

In the configuration back end, open the page *Interfaces / Web*.



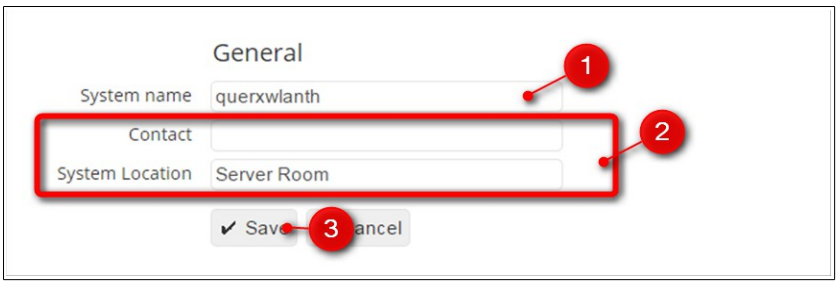
1. In the section *Web interface,* select the language for the web interface.
2. Click on *Save* to apply your changes.

4.1.2 System name, Contact and Location

On the start page of the configuration back end, which can also be accessed over the *System / General* menu item, you can provide some general information..

The *system name* is used to identify the unit in alert notifications and over M2M interfaces. Also, this name is part of the host name, over which you can access the web interface (see chapter 3 Accessing the web interface).

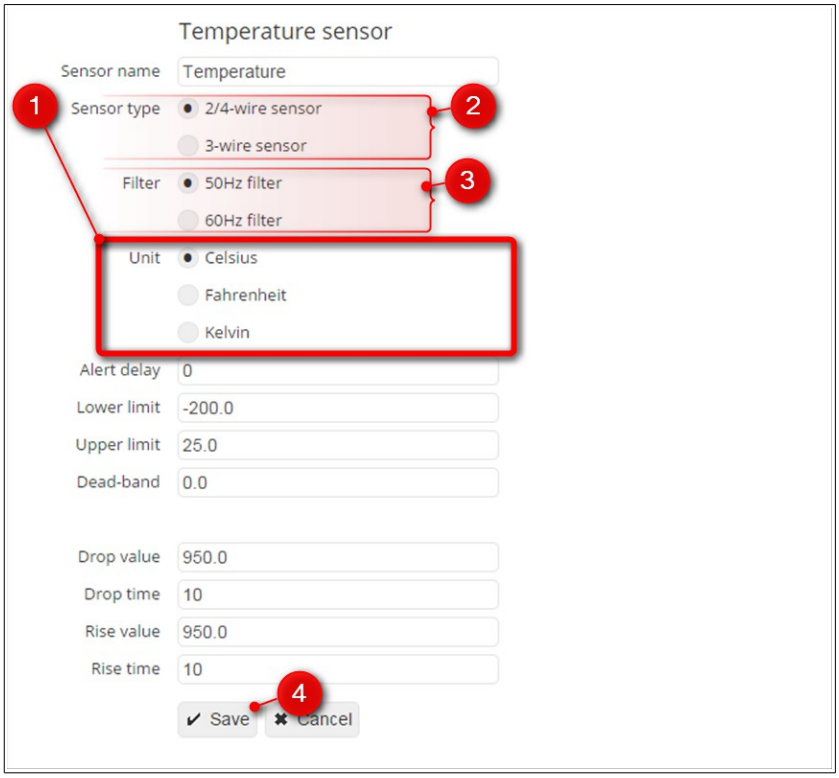
The other parameters are needed for SNMP. For the configuration of SNMP, refer to chapter 6.5 SNMP.



1. Enter a *System name.*
2. If you want to use SNMP, enter a responsible member of staff in *Contact person* and the location of the device in *System location*.
3. Click on *Save* to apply your changes.

4.1.3 Configuration of the temperature probe

In the configuration back end, click on *Sensors / Temperature.*



1. Choose the physical temperature unit for Querx WLAN to work with from the field *Unit*.
2. **Querx WLAN PT** From *Sensor type*, choose the number of wires over which your probe is connected to the device.
3. **Querx WLAN PT** Set the field *Filter* to the utility frequency, which is used in your county. For use in Europe, set it to *50 Hz Filter*.

4. Click on *Save* to apply your changes.

4.1.4 Set date and time

We recommend to automatically obtain date and time using an NTP server.

If Querx WLAN is not connected to the internet and within your local network no NTP server is available, you can also set the values manually.

In the configuration back end, click on *System / Time.*

Set time zone

1. Select the appropriate time zone for your country from *Set time zone*.
2. Set daylight saving time options:
   - **A.** If in your country daylight saving time is applied and time changeover happens at the last Sundays in March and October, check *Auto DST*.
   - **B.** If DST is applied in your country, but time changeover does not happen at the last Sundays in March and October, do not set *Auto DST*. Set *DST* manually when DST is in effect.
3. Click on *Save* to apply your changes.

Automatically obtain date and time

Querx WLAN can automatically obtain date and time over the Net Time Protocol, if an NTP server is available.

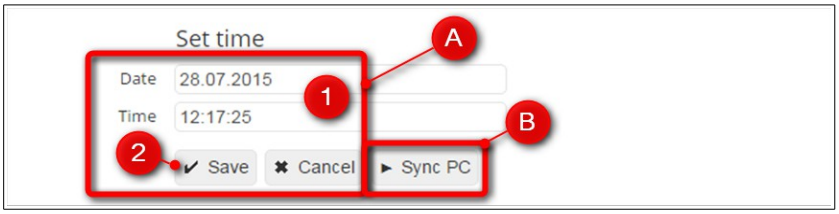
1. Enter the IP address or the host name of an NTP server at *Set NTP*, for example *pool.ntp.org*.
2. Click *Sync NTP* to receive date and time over network.

Information

As long as a valid NTP server is available, Querx WLAN will automatically update date and time once an hour.

Set date and time manually

If you cannot receive date and time over network, you need to manually provide these values or obtain them from the computer from which you configure the device



A. Set time manually

1. In the section *Set time* enter the current date in the little endian date format in the field *Date*. For the February 1st, 2014 this is 01.02.2014. Then, enter the current time in the field *Time*, with hours, minutes and seconds separated by colons. For half past 1 pm, this is 13:30:00.
2. Click on *Save* to apply your changes.

B. Obtain date and time from the configuration computer

1. Click on *Sync PC*. Do **not** click on Save afterward.

4.1.5 Configure data logger

Querx WLAN is equipped with a data logger, which once a minute records following data:

- Maximum values for temperature and humidity
- Minimum values for temperature and humidity
- Average values for temperature and humidity.

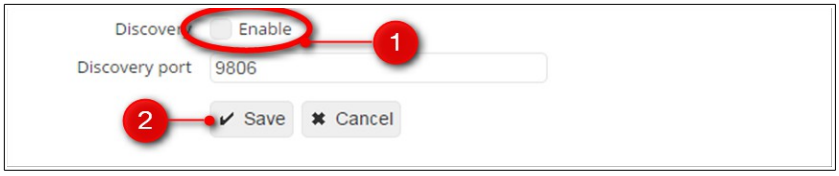
Querx WLAN has a capacity of 4M records. This equates to a period of 7.5 at least years. Values are only recorded, if since the last record, values have changed. Therefore the actual storage period might significantly longer.

The storage is organized as circular queue. If the capacity is exceeded, the oldest entries are overwritten first.

4.1.6 Disable Discovery function

To allow manual network configuration with Device Discoverer, Querx WLAN allows writing access on the configuration with Querx Discoverer per default. After you have initially configured the unit, you should disable this service to increase security.

Open the Page *System / Network*.



1. Untick the check box *Discovery*.
2. Click on *Save* to apply to save you changes.

Information

After having disabled the discovery service, Querx WLAN is not shown in the Device Discoverer any more.

4.1.7 Reset internal memory

As soon, as you put Querx WLAN into operation, the device starts to record its measurements. To restart recording with the new configuration, you can delete the data collected so far.

In the configuration back end, open the page *Maintenance / Reset*.

1. Click on the button *Delete sensor data*.

1. Confirm the data reset by ticking the check box '*Are you sure?*'
2. Afterward click on *Yes*.

Please stay patient, as the operation can take some time. Afterward, the device is restarted and the unit begins the new recording.

4.1.8 Restart the device

If you have changed the network settings and the device was not restarted during the basic configuration, please perform a warm start, as discussed in chapter 8.1 Restart Querx WLAN.

4.2 Network configuration

Querx WLAN can by connected to a network either over the cable based Ethernet interface or over the WLAN interface. Please keep in mind, that the unit supports only one active network interface at time.

To enable the cable Ethernet interface, just plug in a network cable. As soon, as the interface detects a network link, the WLAN interface is disabled.

If you remove the cable from the jack, the WLAN interface is enabled again.

4.2.1 Cable Ethernet interface

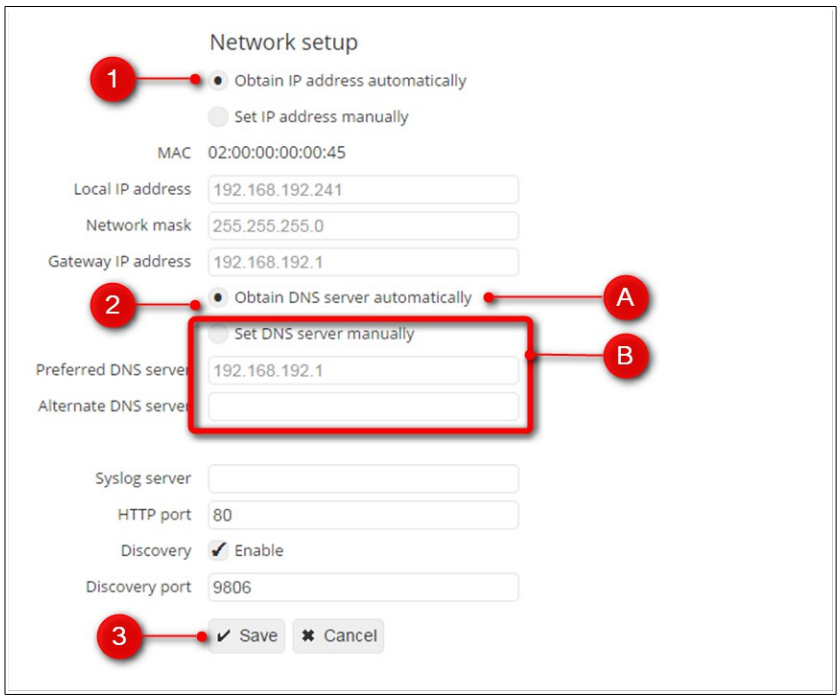
Per default, Querx WLAN obtains a network configuration automatically. Nevertheless, you can assign a static IP configuration. This makes the boot process faster and the device can be addressed over the same IP address at any time.

Information

After changes to the network configuration you need to reboot the device. This is discussed in chapter 8.1 Restart Querx WLAN.

4.2.1.1 Dynamic network configuration

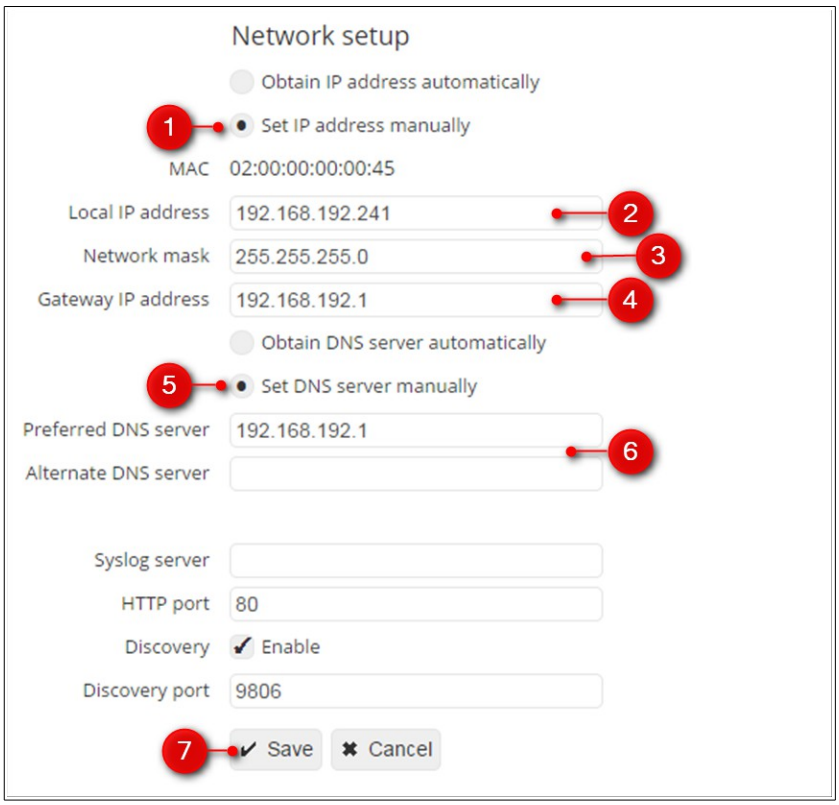
If you want to enable dynamic network configuration via DHCP, please open the Page *System / Network* in the configuration back end.



1. Choose *Obtain IP address automatically*.
2. Configure a DNS server:
   - **A.** If you want to obtain your DNS settings automatically as well, choose *Obtain DNS Server automatically*. Please keep in mind that this work only if a DHCP server is available in your network.
   - **B.** If you want configure own DNS servers, choose S*et DNS server manually* and enter the IP addresses in the fields *Primary DNS server* and *Alternative DNS server*.
3. Click on *Save* to apply your changes.

4.2.1.2 Static network configuration

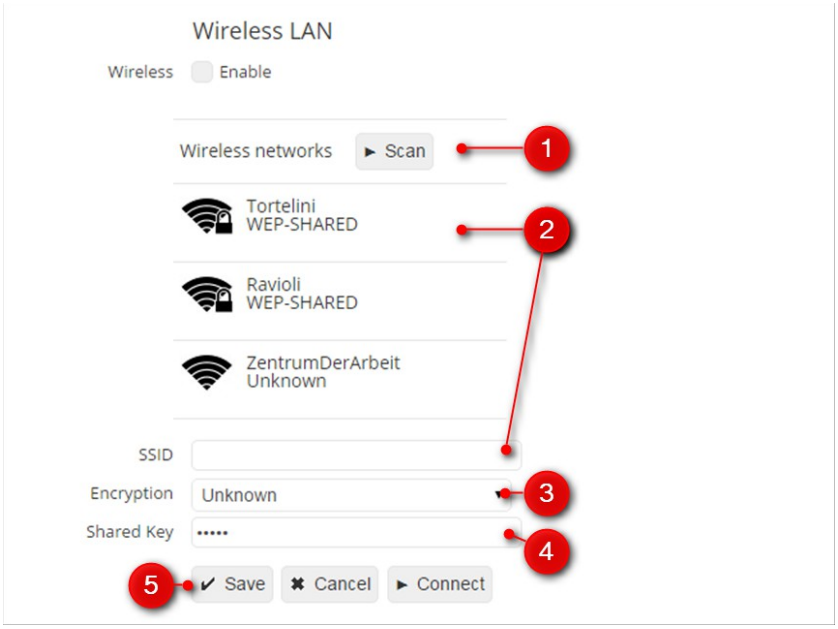
To set up a static network configuration, open the page *System / Network*.



1. *Choose Set IP address manually.*
2. Enter an *IP address* for the device.
3. Enter a *Network mask*.
4. Enter the IP address of the router, which connects the network to the Internet, at *Standard gateway*.
5. Choose *Set DNS server manually*.
6. Enter the IP addresses of the nameserver at *Primary DNS server* and *Alternative DNS server*.
7. Click on *Save*, to apply your changes. Afterward restart the device as discussed in 8.1 Restart Querx WLAN.

4.2.2 WLAN interface

To configure the WLAN interface, open the page *System / WLAN* in the configuration back end.



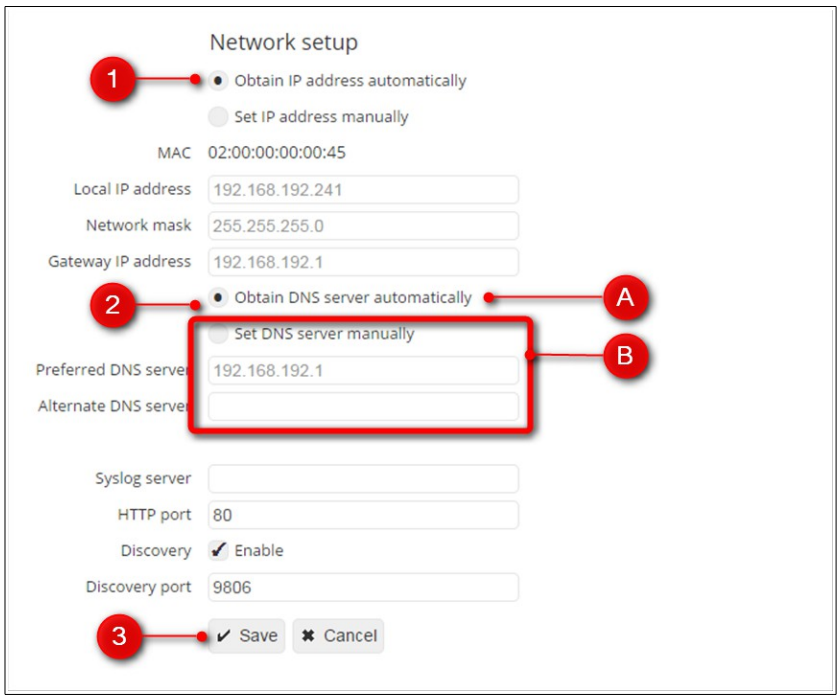
1. Click on *Scan* to update the list of available networks.
2. Choose the network from the list, or if it is hidden, enter the SSID into the field *SSID*.
3. Choose the encryption method for the network from *Encryption*.
4. Enter the *Shared Key* for your network
5. Click on *Save* to apply your changes.

Information

You need to restart the device after you change the network configuration. This is discussed in chapter 8.1 Restart Querx WLAN.

4.2.2.1 Dynamic network configuration

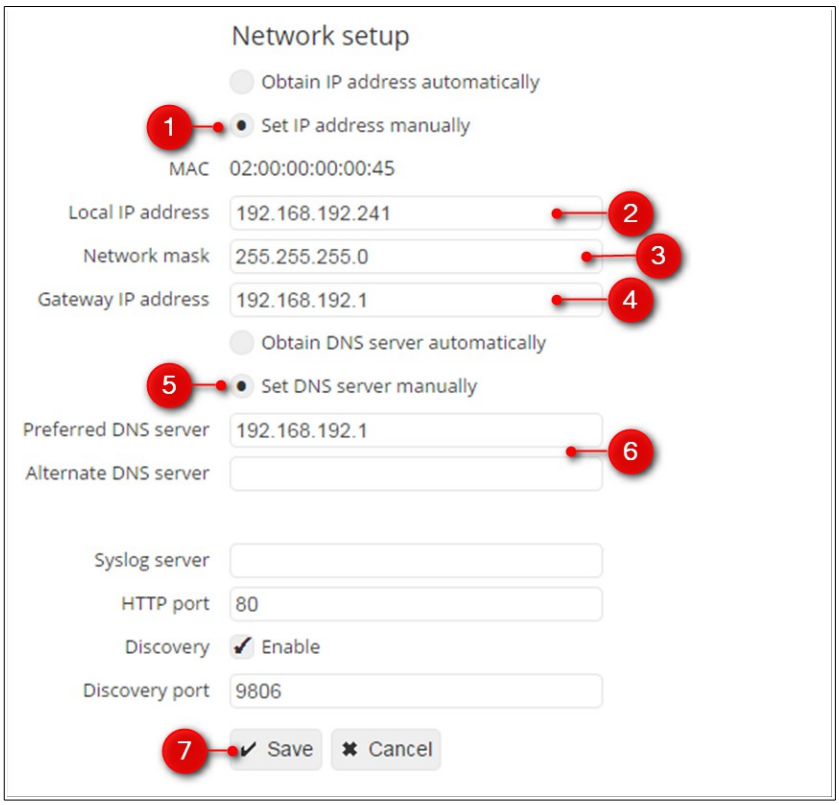
If you want to enable danyamic network configuration via DHCP, please open the Page *System / Network* in the configuration back end.



1. Choose *Obtain IP address automatically*.
2. Configure a DNS server:
   - **A.** If you want to obtain your DNS settings automatically as well, choose *Obtain DNS Server automatically*. Please keep in mind that this work only if a DHCP server is available in your network.
   - **B.** If you want configure own DNS servers, choose S*et DNS server manually* and enter the IP addresses in the fields *Primary DNS server* and *Alternative DNS server*.
3. Click on *Save* to apply your changes.

4.2.2.2 Static network configuration

To set up a static network configuration, open the page *System / Network*.



1. *Choose Set IP address manually.*
2. Enter an *IP address* for the device.
3. Enter a *Network mask*.
4. Enter the IP address of the router, which connects the network to the Internet, at *Standard gateway*.
5. Choose *Set DNS server manually*.
6. Enter the IP addresses of the nameserver at *Primary DNS server* and *Alternative DNS server*.
7. Click on Save, so apply your changes. Afterward restart the device as discussed in chapter 8.1 Restart Querx WLAN.

4.2.3 Select active network interface.

The active network interface is selected automatically, depending on the link status of the cable Ethernet interface. If a network link is detected, the cable Ethernet interface is enabled. If no link is detected, the wireless interface is enabled.

Changing the active interface makes the device reboot and can therefore take some time.

The active network interface is indicated by the status LED as long, as not alert is in effect:

- **green** active cable Ethernet connection
- **blue** active WLAN interface

4.3 User Management

Querx WLAN can be accessed as anonymous user, who needs no authentication. You can configure up to three additional users and disable the anonymous access.

You can assign access right groups to the system users:

- **Disabled***:* User has no access to the device.
- **Read data**: User can read measured data.
- **Read data / read config:** User can read measured data and device configuration.
- **Read data / write config:** User has unrestricted access to measurement data and to the device configuration.

4.3.1 Add user

To add a user, open the page *System / Users*.

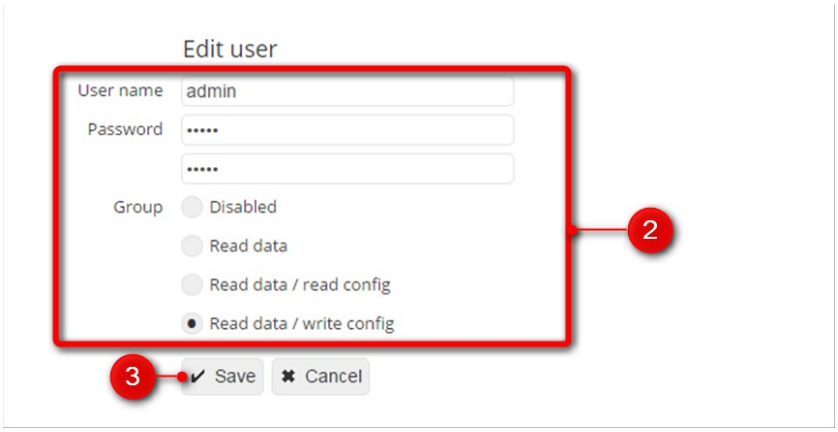
1. In the section *Users* click on the *Add* button next to a free line.

2. On the following page enter a *User name* and a *Password* in the according fields.
3. Choose access right *Group* for the user
4. Click on *Save* to apply your changes.

4.3.2 Edit user

Open the page *System / Users* in the configuration back end.

1. In the section Users, click on the *Edit* button.



2. Do your changes.
3. Click on *Save* to apply your changes.

Information

It is only possible to remove write access from a user, as long, as at least one other user exists, who is able to write the configuration.

4.3.3 Remove user

In the configuration back end, open the page System / User.

1. Click on the *Delete* button next to the user you want to remove.

2. Confirm the removal by clicking *Yes* on the following page.

Information

You can only remove users with write access to the configuration, as long, as at least one other user exists, who is able to write the configuration.

4.3.4 Disable anonymous access

As soon, as you have added a user who has write access on the configuration, you can disable or restrict anonymous access. Open the page *System / Users* in the configuration back end.

1. In the section *Users* click on the *Edit* button next to the Anonymous user.

2. Do completely disable anonymous access, choose *Disabled* from *Group*. If you only want to restrict anonymous access, choose the according group.
3. Click on *Save* to apply your changes.

4.3.5 Automatic log out

If a logged in user shows no activity for a certain period, he will be automatically logged out. To configure this period, open the page *System / Users* in the configuration back end.

1. In the section *Session* enter the number of seconds, after which a user should be logged out automatically in the field *Session timeout*. If you want to disable automatic log outs, enter *0*.
2. Click on *Save* to apply your changes.

5 Configuration of Alerts

If critical environmental conditions occur, Querx WLAN can trigger alerts , over which the unit can inform via email, SNMP trap and syslog message.

5.1 Alert basics

Querx WLAN supports following types of alerts:

- Upper temperature limit exceeded
- Lower temperature limit undergone
- Temperature rising too fast
- Temperature falling too fast.

The model Querx WLAN TH additionally supports following types of alerts:

- Upper humidity limit exceeded
- Lower humidity limit undergone
- Humidity rising too fast
- Humidity dropping too fast
- Upper dew-point limit exceeded
- Lower dew-point limit exceeded

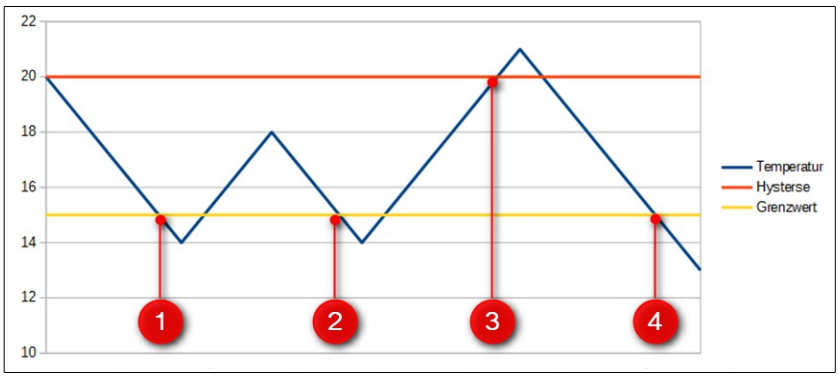
Information

Alerts are triggered, if measured values exceed a limit, not if they reach it.

5.1.1 Dead-band

To avoid repetitive alert notifications, you can set up a dead-band for alerts, which are based on exceeding thresholds.

This value determines, in how far the measured values have to move back in the direction of the normal state before another alert is triggered on again exceeding the threshold.

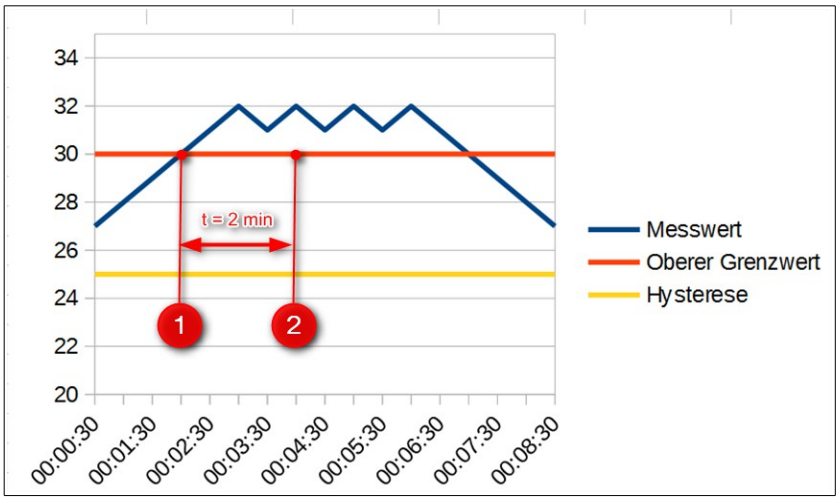


In this example, a lower temperature limit of **15°C** is set, Dead-band is **5**.

If a measured value under-runs the lower limit **(1)**, an alert is triggered. If the value rises and again falls below the lower limit, no further alert goes off **(2)**. The device needs to measure at least 20°C **(3)**, before a new alert can be triggered **(4)**.

5.1.2 Alert delays

If short-term fluctuations in measurements should be accepted, e. g. temperature drops during ventilation, it is possible to configure an alert delay. This value determines how long a threshold needs do be exceeded steadily, before the according alert is triggered.



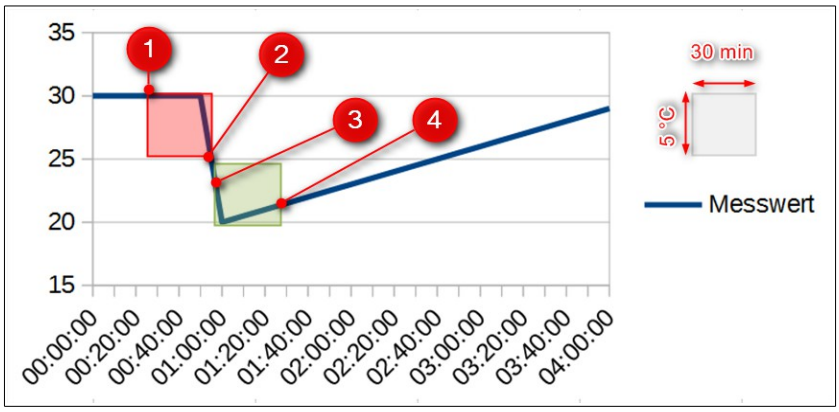
In this example, delay is set to 2 minutes. The value is exceeded at 1:30 minutes **(1)**. Nevertheless, the unit only triggers an alert at 3:30 **(2)**.

Please keep in mind, that the dead-band is applied here as well. The sensor needs to measure less than 25°C to prevent the alert from going off.

5.1.3 Alert for heavy fluctuations

For temperature and humidity, it is possible to configure alerts based on the difference between measured minimum and maximum values within a certain period.

These alerts stay active, as long as the unit can detect the maximum difference over that period. It is possible to configure different alerts for rising and dropping temperatures.



This example shows a temperature drop, after a window was opened. *Drop value* is set to 5°C, *Drop time* is set to 30 minutes.

At 0.20 **(1)** the probe measures a temperature of 30°C. At 0.50 a window is openedand the temperature drops to 20°C immediately. Short time after, the unit detects a temperea-ture difference of more than 5°C within the last 30 minutes and triggers an alert **(2)** . At around 1:30 **(4)** the maximum difference is smaller than 5°C over the last 30 minutes and the alert is disabled **(3)**.

5.1.4 Actions to be carried out on alerts

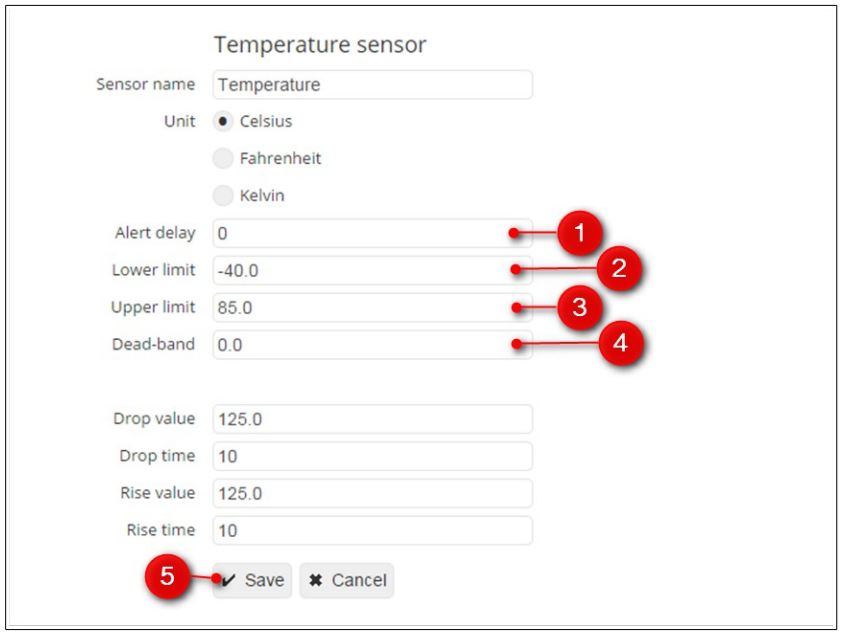
Querx WLAN can cope with triggered alerts in several ways. This is discussed in detail in chapter 6 Configuration of Interfaces.

5.2 Setting up alerts

5.2.1 Temperature alerts

To configure temperature alerts, open the page *Sensors / Temperature* in the configuration back end.

Alert for exceeding thresholds



1. If you want to accept short-term fluctuations, enter the amount of seconds by which an alert should be postponed in *Alert delay*.
2. At *Lower Limit* enter the temperature which has to be under-run to raise an alert for *temperature too low*.
3. At *Upper Limit* enter the temperature which has to be exceeded to raise an alert for *temperature too high*.
4. Enter a value for *Dead-band*, e. g. 2.
5. Click on *Save* to apply your changes.

Alerts for temperatures dropping or falling to fast

Alerts for falling and rising temperature need two values each: The maximum temperature difference and the time in which this difference should not occur.

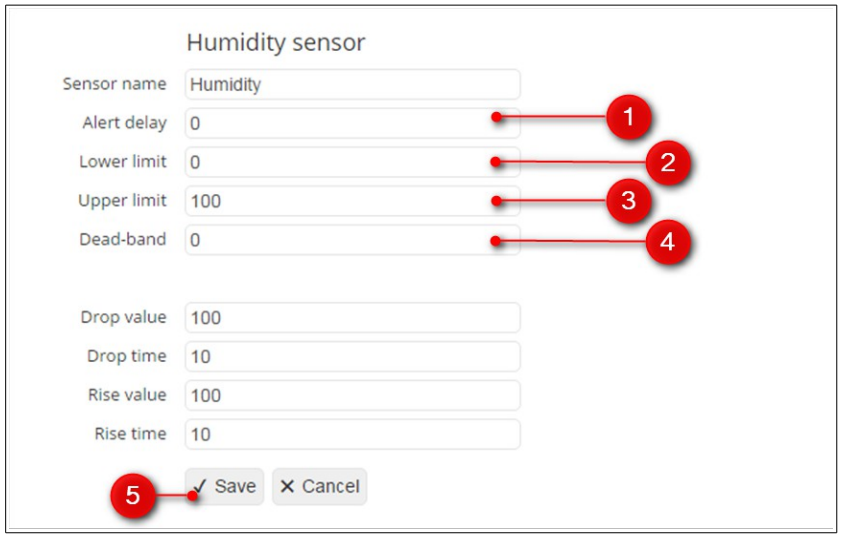
1. First enter the maximum temperature difference for falling temperature at *Drop value*.
2. Now enter the number of seconds, in which this difference should not occur at *Drop time.*

1. Enter the maximum temperature difference for rising temperature at *Rise value*.
2. Now enter the number of seconds, in which this difference should not occur at *Rise time.*

5.2.2 Humidity alerts (Querx WLAN TH)

To set up humidity alerts, open the page Sensors / Humidity.

Alert for exceeding thresholds

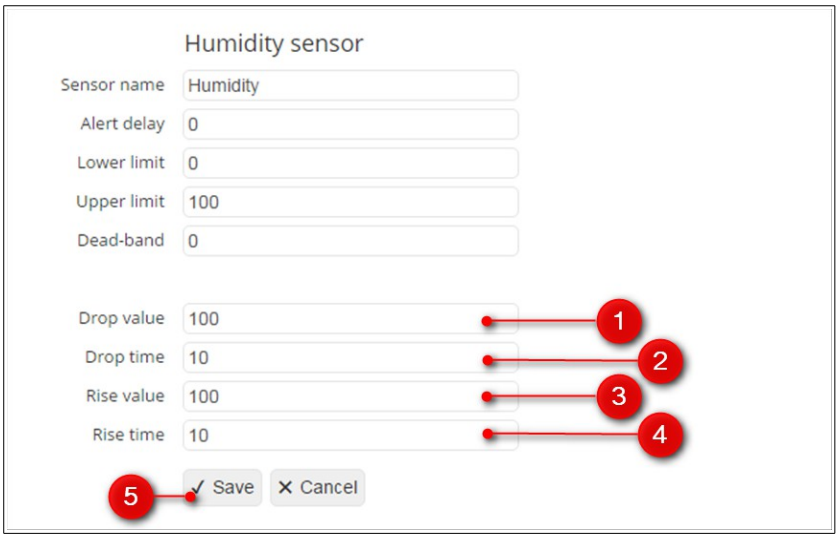


1. If you want to accept short-term fluctuations, enter the amount of seconds by which an alert should be postponed in *Alert delay*.
2. At *Lower Limit* enter the value which has to be under-run to raise an alert for *temperature too low*.
3. At *Upper Limit* enter the value which has to be exceeded to raise an alert for *humidity oo high*.
4. Enter a value for *Dead-band*, e. g. 2.
5. Click on *Save* to apply your changes.

Alerts for rising or dropping humidity values

Alerts for falling and rising humidity values need two values each: The maximum temperature difference and the time in which this difference should not occur.

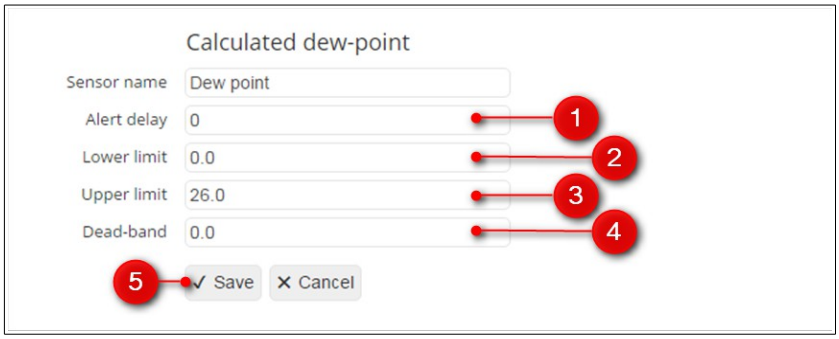
1. First enter the maximum difference for falling value at *Drop value*.
2. Now enter the number of seconds, in which this difference should not occur at *Drop time.*
3. Enter the maximum difference for rising values at *Rise value*.
4. Now enter the number of seconds, in which this difference should not occur at *Rise time.*



5.2.3 Dew point alerts (Querx WLAN TH)

Alerts for exceeding thresholds

Dew-point alerts can be set up on the page *Sensors / Dew Point*



Alert for exceeding thresholds

1. If you want to accept short-term fluctuations, enter the amount of seconds by which an alert should be postponed in *Alert delay*.
2. At *Lower Limit* enter the dew-point which has to be under-run to raise an alert for *Dew-point too low*.
3. At *Upper Limit* enter the dew-point which has to be exceeded to raise an alert for *Dew-Point too high*.
4. Enter a value for *Dead-band*, e. g. 2.
1. Click on *Save* to apply your changes.

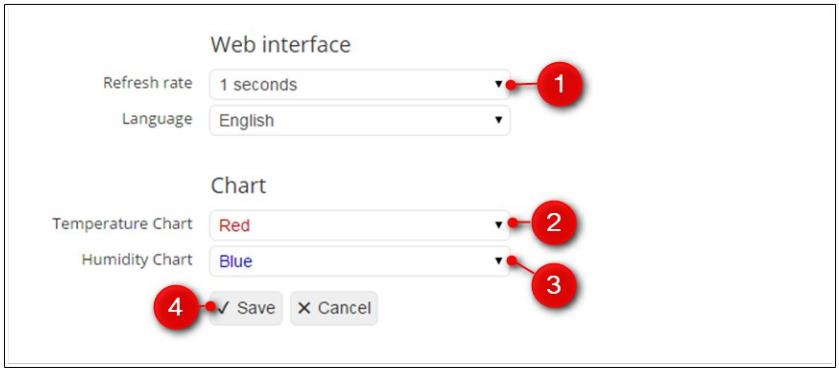
6 Configuration of Interfaces

Querx WLAN provides several interfaces to request currently measured and recorded values and to inform on occurring alerts.

6.1 Web interface

6.1.1 Configuration of the web interface

In the configuration back end, open the page *Interfaces / Web.*



1. In the section *Web interface*, select the period of time from *Refresh rate*, after which the dynamic information on the web pages, such as temperature, time or used memory, should be updated.
2. In the section *Chart*, choose the color for the temperature graph from *Temperature color*.
3. **Querx WLAN TH**: In the section *Chart*, choose the color for the humidity graph from *Humidity color*.
4. Click on *Save* to apply your changes.

6.2 E-Mail interface

Querx WLAN sends email notifications to up to 4 recipients over up to 2 email servers.

6.2.1 Manage email accounts

To enable sending emails, you need to provide at least one email account. You optionally can add a second email account as fall-back.

In the configuration back end, open the page *Interfaces / Email.*

1. In the section *Email accounts*, click on the action *Add* next to one of the free slots.

2. On the next page, enter the sender's email address in the field *Sender*.
3. Enter the host name or IP address of the mail server in *SMTP server*.
4. Specify the SMTP port for your mail server at *Port*.
5. If you need to authenticate at your mail server, activate the check box *Authentication*.
6. Enter a *User name* and a *Password* in the appropriate fields.

Information

The log in data is written to the device without encryption. So do not use an email account over which intimate communication is carried out. If needed, create an own account for Querx WLAN.

7. Click on the *Test* button to check your settings. If everything is fine, the button turns green. If you have made a

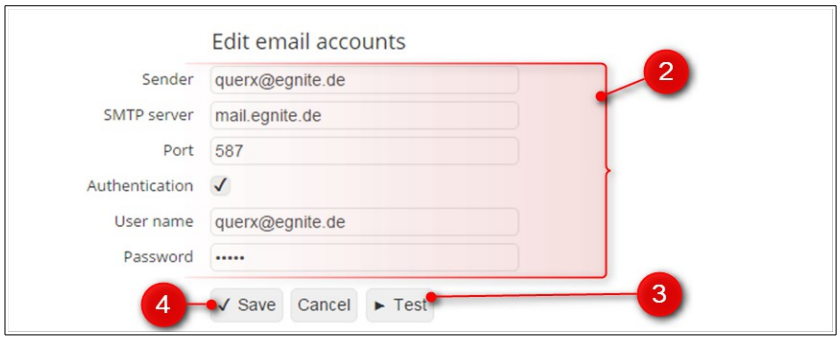
mistake, the corresponding field will get highlighted. Correct the error and click on *Test* again.

8. Click on *Save* to apply your changes.

Edit email account

In the configuration back end, open the page *Interfaces / Email.*

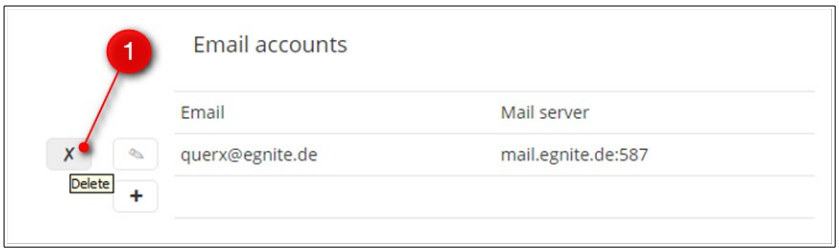
1. In the section *Email accounts*, click on *Edit* next to the account, that you want to change.



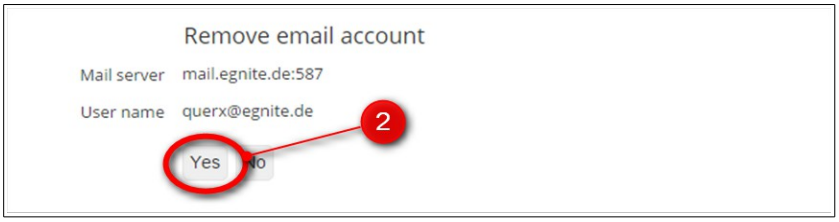
2. On the following page, make your changes.
3. Click on the *Test* button to check your settings. If everything is fine, the button will turn green. If you have made a mistake, the corresponding field will be highlighted with a red border. Change the fields and click on *Test* again.
4. Click on *Save* to apply your changes.

Remove email account

1. In the configuration back end, open the page *Interfaces / Email.*



1. In the section *Email accounts* click on the action *Delete* next to the account you want to remove.

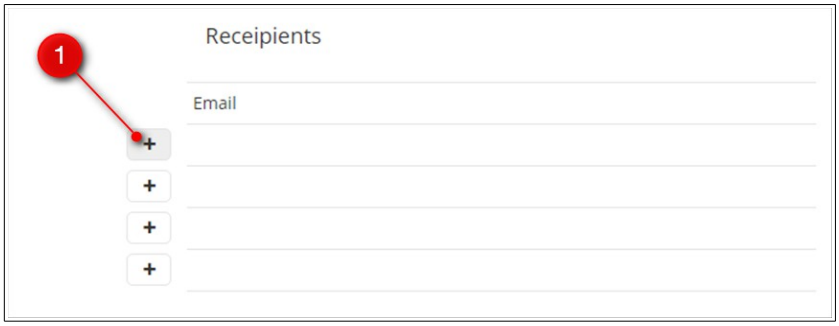


2. Confirm the removal by clicking *Yes* on the following page.

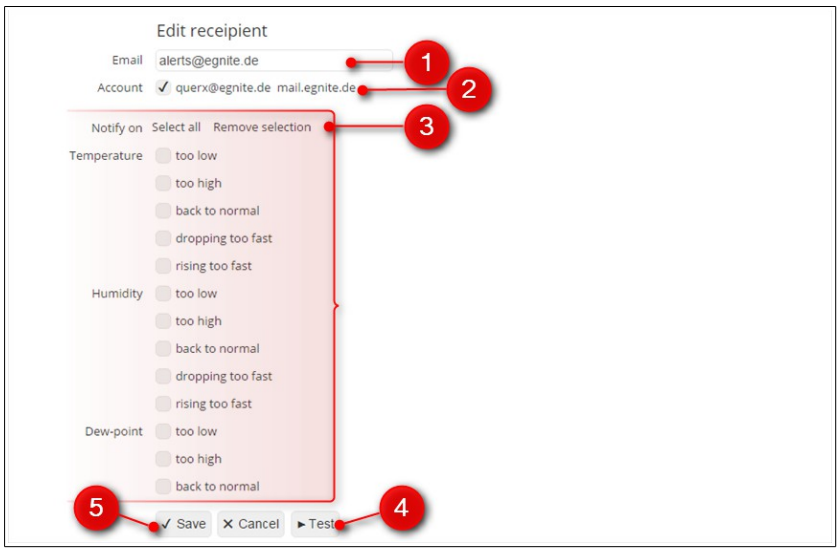
6.2.2 Manage email recipients

Querx WLAN supports up to 4 email recipients, each of whom you can assign the mail server over which emails are sent. Also, you can choose the events on which notifications are sent for each recipients.

In the configuration back end open the page *Interfaces / Email.*



1. In the section *Recipients*, click on the action *Add* next to one of the free slots.

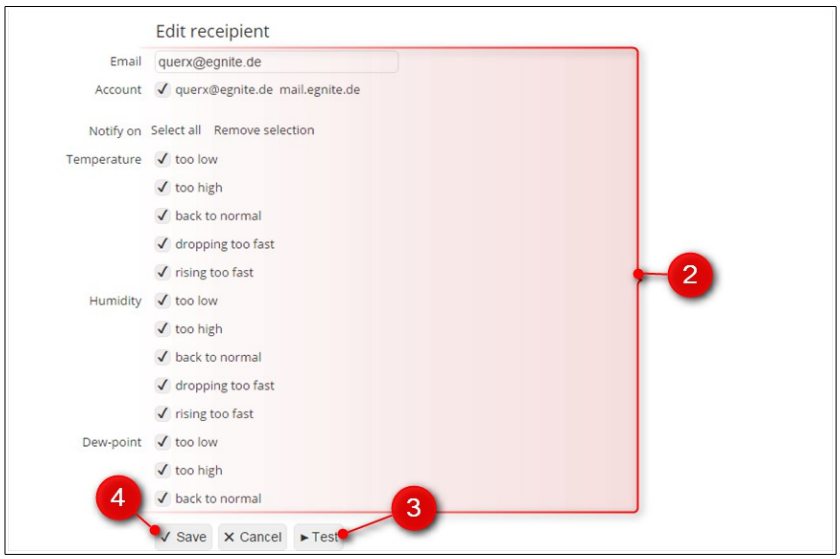


1. On the next page enter the email address for the recipient in the field *Email.*
2. Choose the account over which you want emails to be sent to this address. Check the second account if you want to use it as a fall-back.
3. At *Notify on*, choose the events for which you want to send notifications to this recipient.
4. Click on *Test*, to check the settings. Check your email afterward.
5. Click on *Save* to apply your changes.

Edit email recipient

In the configuration back end, open the page *Interfaces / Email.*

1. In the section *Recipients*, click on the action *Edit* next to the recipient you want to change.

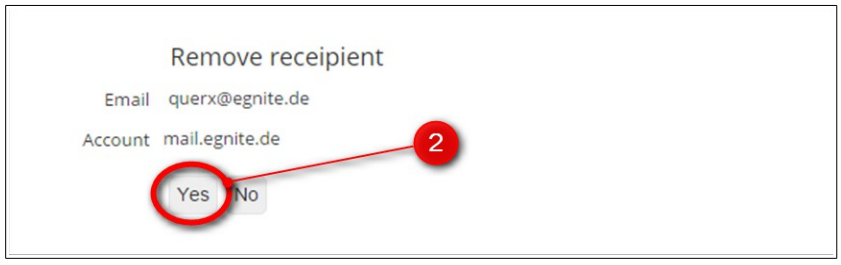


2. On the next page, make your changes.
3. Click on *Test*, to check the new settings.
4. Click on *Save* to apply your changes.

Delete email recipient

In the configuration back end, open the page *Interfaces / Email.*

1. In the section *Recipients* click on the action *Delete* next to the recipient, which you want to remove.

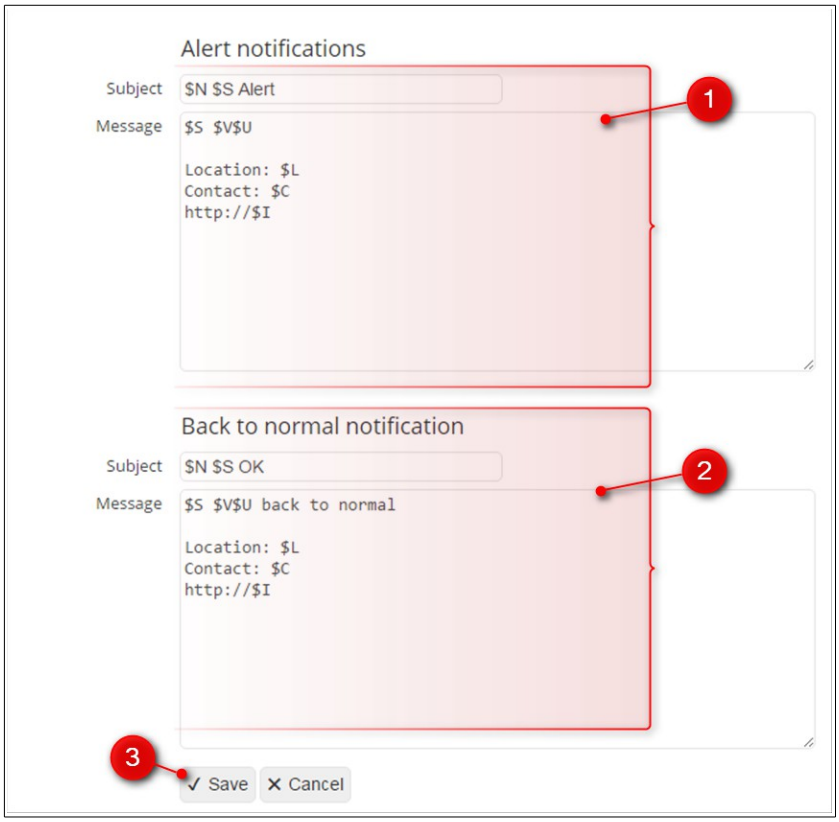


2. Confirm the removal by clicking on *Yes* on the next page.

6.2.3 Email templates

Querx WLAN sends notifications when alerts occur or when the unit returns to the normal state. For both cases, you can define templates.

In the configuration back end, open the page *Interfaces / Email*.



1. In the section *Alert notifications*, enter a *Subject* and an *Message* for alerts going off.
2. In the section *Back to normal notification* enter a *Subject* and a *Message* to be sent when the device returns to the normal state.

   You can use following variables, that are dynamically substituted on sending out the notifications:

$S	Name of the sensor that has triggered the alert
$V	Measured value
$U	Physical unit of the measured value

$I	IP address of the device
$L	Location of the device
$N	Host name of the device
$C	Responsible member of staff

3. Click on *Save* to apply you changes.

6.3 Cloud services

Querx WLAN can export the measured data to the Internet-of-Things clouds Xively and ThingSpeak. This allows world wide data access and easy integration into own projects.

Cloud services are updated every full 10 minutes.

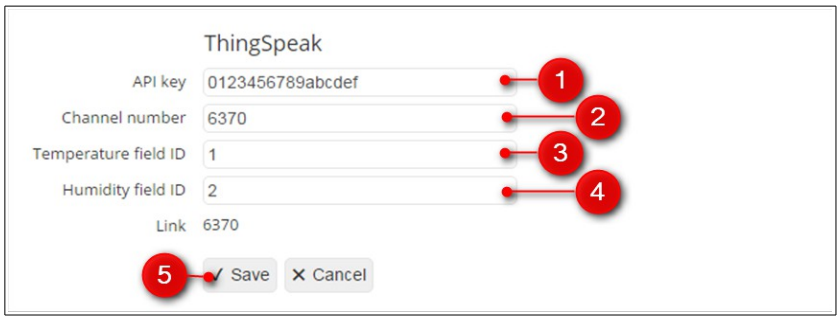
6.3.1 Data export to ThingSpeak

For the data export to ThingSpeak, you need to set up a ThinkSpeak channel. This can be done free of charge at the cloud provider's website: www.thingspeak.com

To set up a cloud connection you will need the following data:

- The channel ID of your think speak channel
- The field ID for temperature values
- The write API key

In the configuration back end, open the page *Interfaces / Cloud*.



1. In the section *ThingSpeak*, enter your write API key in the field *API key*.
2. Enter your Channel number in the field *Channel number.*
3. Enter the ID for the temperature field in *Temperature Field ID*.
4. Click on *Save* to apply your changes.

After saving your ThingSpeak configuration, you find a *Link* below. If you click on that link, your ThinkSpeak channel will be opened in a new browser window.

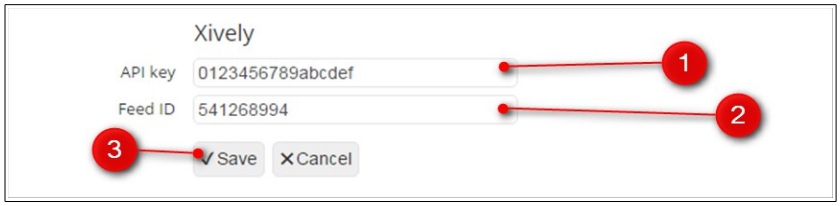
6.3.2 Data export to Xively

To connect Querx WLAN to Xively, you will need a Xively feed. You can set this up at the cloud provider's website: www.xively.com.

You will need the following data to connect Querx WLAN to Xively.

- The ID of the Xively feed for Querx WLAN to update
- The API key that allows Querx WLAN to write on that feed

In the configuration back end, open the page *Interfaces / Cloud.*



1. In the section Xively, provide the *API key* for write access.
2. Enter the *Feed ID* for your Xively feed.
3. Click on *Save*, to apply your changes.

After saving the configuration, you will find a *Link* below. If you click on that link, your Xively feed will be opened in a new browser window.

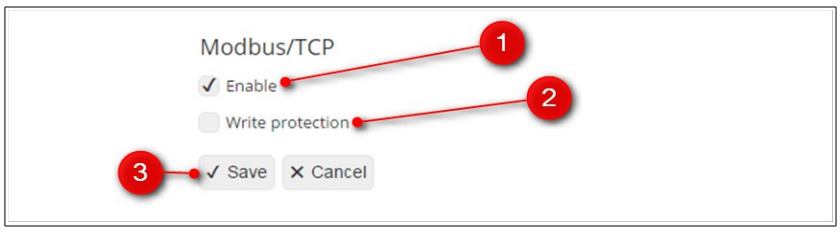
6.4 Modbus/TCP

Querx WLAN can send data via Modbus/TCP, for example if you want to employ the device in industrial applications (SCADA).

You can find a listing of all addressable registers in chapter 9.6 Modbus Registers. Hands-on examples on how to use Querx and Modbus/TCP can be found on the product page at http://sensors.egnite.de.

6.4.1 Activate Modbus/TCP

In the configuration back end, open the page *Interfaces / Modbus*.



1. Tick the check box *Enable* to activate Modbus/TCP.
2. If you want to allow configuration changes via Modbus/TCP, uncheck the check box *Write Protection*.
3. Click on *Save* to apply your changes.

6.5 SNMP

The Simple Network Management Protocol SNMP allows to integrate Querx WLAN into network management systems, such as Nagios, OpenNMS or Zabbix.

You can find the important SNMP OIDs in chapter The MIB can directly be downloaded from the device.

Some hands-on examples on how to use Querx WLAN with SNMP, can be found on the product's website at http://sensors.egnite.de. Importand SNMP OIDs can be found in chapter 9.7 SNMP Object Identifiers.

6.5.1 General settings

In the configuration back end, open the page *System / General.*

1. Enter a *System name* to identify the device over SNMP. Please keep in mind, that this name is also the host name for Querx WLAN, trough which it can be connected in the network.
2. In the field *Contact* provide a responsible member of staff.
3. Enter a *System location* for Querx WLAN.
4. Click on *Save* to apply your changes.

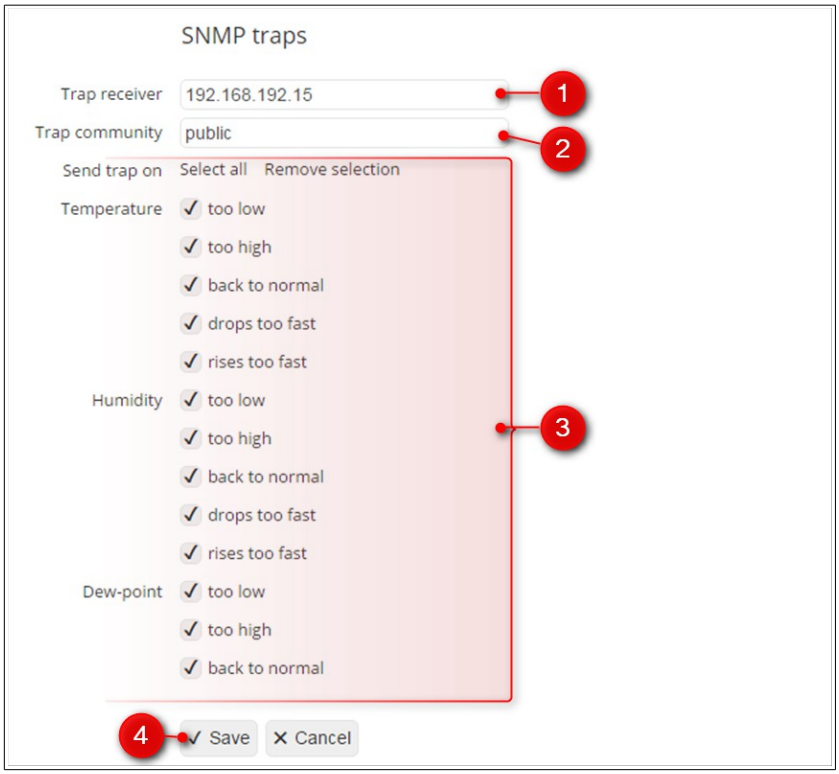
6.5.2 Activate SNMP Agent

In the configuration back end, open the page *Interfaces / SNMP.*

1. In the section *SNMP agent*, tick the check box *Enable*, to active the SNMP agent.
2. Check the *Read community* and adjust it, if needed.
3. Click on *Save* to apply your changes.

6.5.3 Activate SNMP traps

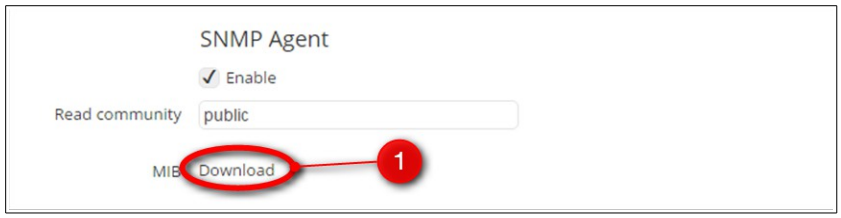
In the configuration back end, open the page *Interfaces / SNMP.*



1. In the section *SNMP traps*, provide the host that will receive traps sent by Querx WLAN at *Trap destination.*
2. Check the *Trap Community* and adjust it, if needed.
3. Select the events on which a SNMP trap should be send at *Send trap on.*
4. Click on *Save* to apply your changes.

6.5.4 Download MIB

In the configuration back end, open the page *Interfaces / SNMP.*



1. In the section *SNMP agent*, click on *Download* next to *MIB.*

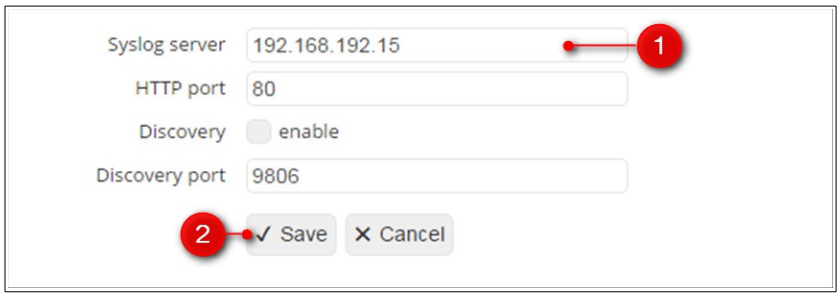
6.6 Syslog

Querx WLAN can send a multitude of logging, error and alert messages though syslog. If problems occur, this functionality helps you to spot their origin.

Software to receive syslog messages can be downloaded from the Internet.

6.6.1 Configure syslog server

In the configuration back end, open the page *System / Network*.



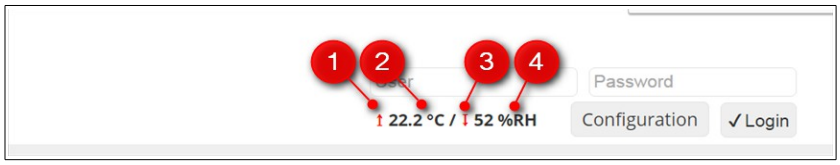
1. Provide the IP address or the host name of your syslog server at *Syslog server*.
2. Click on *Save* to apply your changes.

7 Data access

7.1 Web interface

7.1.1 Currently measured values and alerts

In the upper right corner of the homepage, you can see currently measured values and active alerts.



On the image above, you can see:

1. An alert (↥) for *Temperature being too high*
2. at a value of *22,2 °C*
3. An alert for *Humidity being too low* (↧)
4. at a humidity level of *52 % RH*

If there is an active alert, the on of the following alert symbols is shown, blinking red:

Alert	Symbol
Lower limit under-run	↧
Upper limit exceeded	↥
Value drops too fast	↓
Value rises too fast	↑
Sensor failure	✖

7.1.2 Last sensor events

In the configuration back end, you can review the last 16 sensor events, such as alerts, returns to normal states or sensor failures. You find the last sensor events on the page *Maintenance / Events*.

Last events

Date / Time	Event	Value
29.07.2015 12:57:22	Humidity too low	52%RH
29.07.2015 12:57:13	Temperature too high	22.3°C

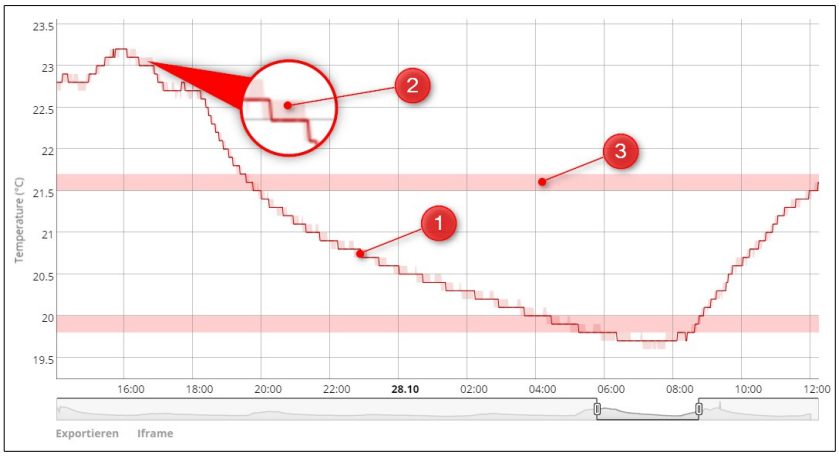
7.2 Data logger

Every, Querx WLAN records maximum, minimum and average values for the last 60 seconds. With a capacity of 4,000,000 records, it is thus possible to aquire data for 7.5 years.

On power failures, the sensor doe's not record new records. Data acquired so far is stored persistently and will not be lost. As soon as the power returns, Querx WLAN continues with the recording.

7.2.1 Visualisation of recorded readings

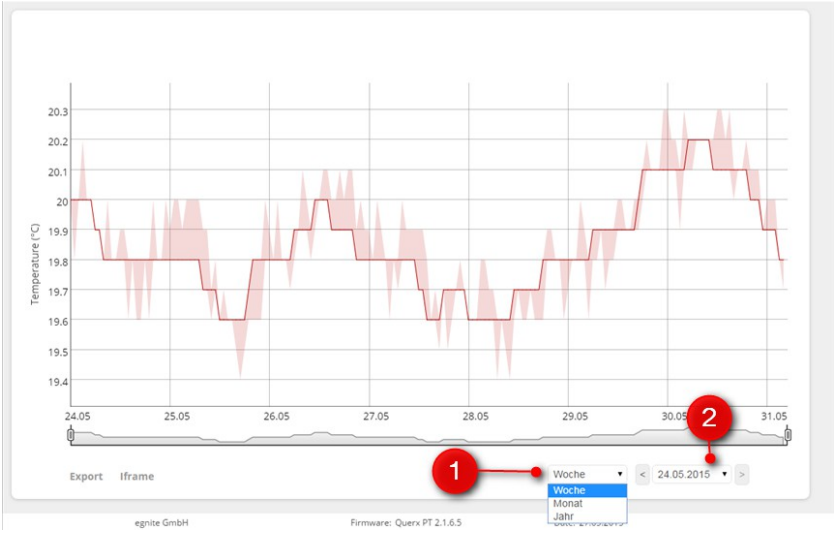
The chart on the home page show the development of temperature and, if you use Querx WLAN TH, humidity from the beginning of the recording.



Full-color lines (**1**) show average average values, the brigther areas (**2**) surrounding this line show the minimum and maximum values.

The horizontal bars show the thresholds, on which alerts are raised. Their width shows the dead band (**3**).

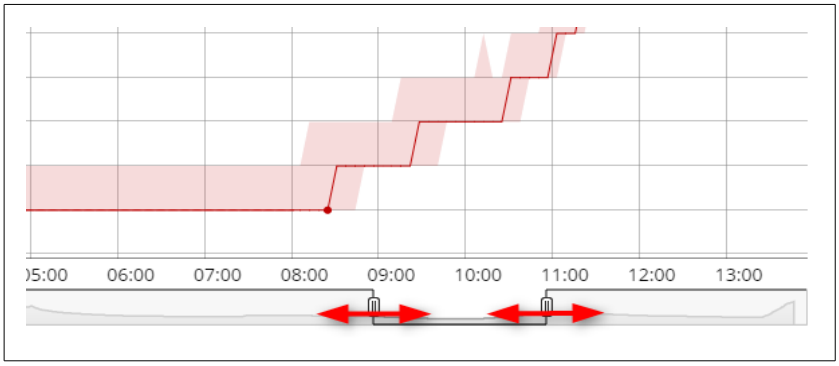
Set displayed period



1. Choose the *period* which you want to display. Possible periods are year, month or week.
2. No choose the *start date* for this period.

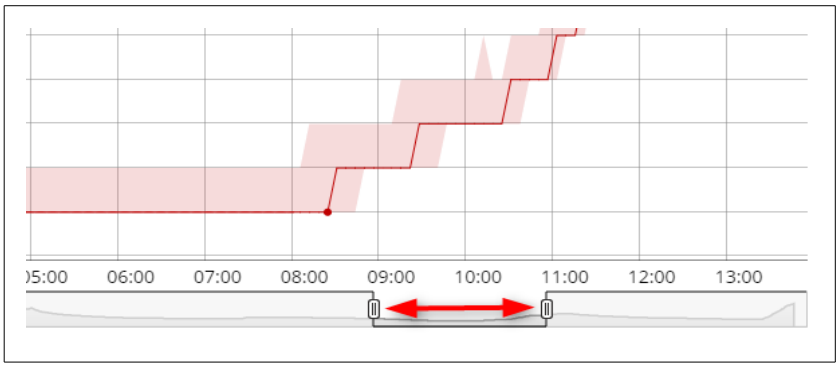
Adjust displayed peridod

The gray bar below the chart is the time line of the selected period. With the two sliders to the left and the right, you can adjust the shown period.



The emphasized area between the sliders can be moved to change the start date of the shown period.

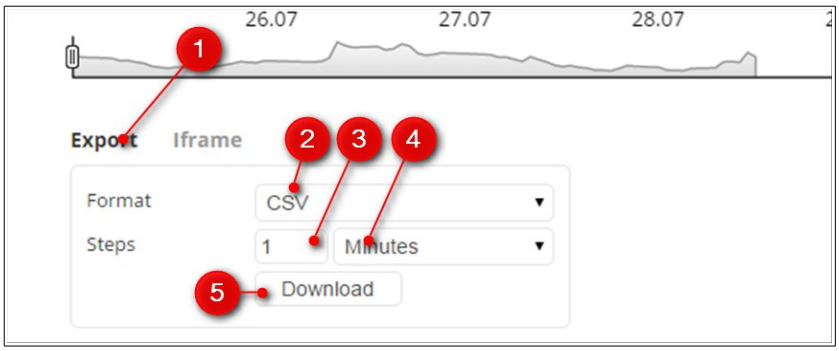
Change start time of period



7.2.2 Export recorded data via web interfaces

You can export the recorded data over the web interface. Querx WLAN supports the data formats CSV and XML[1].

Open the Querx WLAN's web interface and set period and start date as discussed in the last section.



1 Over the HTTP interface, you can also request the data as JSON.

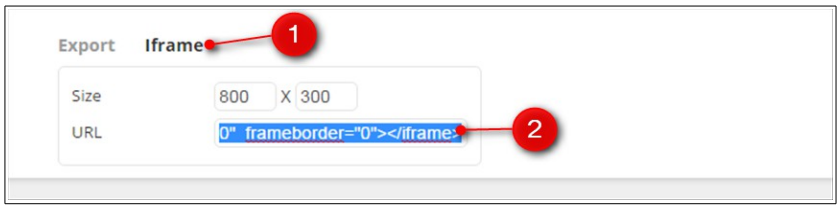
1. Click on *Export.*
2. Choose an export data format from *Format.*
3. At Steps, set the *time* between to records in the export file.
4. Click on *Download.*

One record contains the date and start time, as well as measured average, minimum and maximum values that have occurred in the period you have set at steps.

7.2.3 Embed chart into other pages

Within your local network it is possible to embed the chart from the home page in other web pages using an Iframe.

Open the Querx WLAN's home page.



1. Click on *Iframe.*
2. Copy the shown HTML source code into the clip board.

Paste the HTML code into the source of the page, into which you want to embed the chart.

7.3 Data access over cloud providers

If you have set up cloud services, you can access the transmitted data over the according web site or using the application programming interfaces, provided by the cloud service.

To log in into ThingSpeak, use the following URL https://thingspeak.com/login.
The developer's documentation can be found on https://thingspeak.com/docs.

To log in into ThingSpeak, use the following URL https://personal.xively.com/ einloggen.
The developer's documentation can be found on https://personal.xively.com/dev/.

7.4 Mobile Apps

For Android and iOS are apps available to access the sensor data from your mobile device.

On https://play.google.com/store you can find the app **Querx Discoverer**, using which you not only can access the sensor data over LAN and cloud, but also configure the device using the discovery service.

The Canadian company **Codenize** provides the app **IoT** monitor, with which you can access access cloud data over iPhone.

7.5 HTTP interface

Querx WLAN allows to request currently measured and recorded data over HTTP. This makes it easy to set up own monitoring solutions.

7.5.1 Requesting current data

Over the address

```
http://<IP>/tpl/document.cgi?tpl/j/live.tpl&msub=<FORMAT>
```

you have access to current measurement. The parameter msub specified the format, in which data is returned. Possible formats include XML, CSV and JSON.

You can find example applications in the tutorial section on sensors.egnite.de.

7.5.2 Requesting recorded data

Over the address

```
http://<IP>/tpl/document.cgi?tpl/j/<FORMAT>.tpl
```

you can access the data logger over HTTP. Following POST parameters are available:

start Start time as Unix time-stamp
end End time as Unix time-stamp
step Resolution in seconds
fname Returned file name

Data can be returned as XML, CSV and JSON.

Following example returns values from April 1st 2015 0.00 to April 2nd 2015 0.00 with 1 minute between two records.

```
http://192.168.192.100/tpl/j/document.cgi?
tpl/j/xml.tpl&start=1427846400&end=1427932800&step=60
```

You can find example applications in the tutorial section on http://sensors.egnite.de.

8 Maintenance, tips and troubleshooting

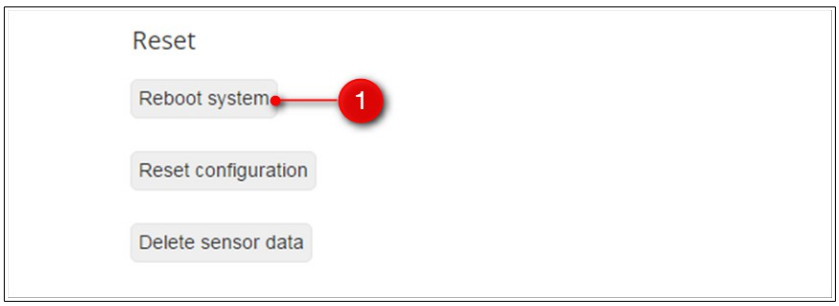
8.1 Restart Querx WLAN

There are two ways to restart Querx WLAN.

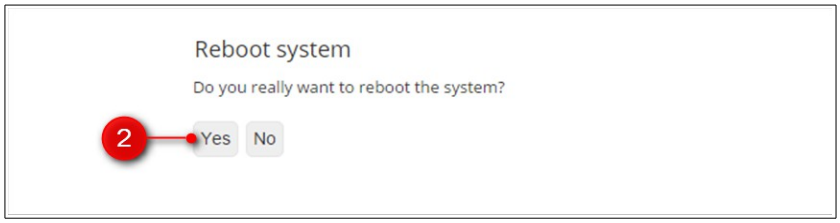
8.1.1 Warm reboot

After some configuration changes, a reboot of the system is required.

In the configuration back end, open the page Maintenance / Reset.



1. Click on the button *System reset*.



2. Confirm reboot by clicking *Yes* on the next page.

8.1.2 Cold reboot

If the device does not react any more, you can perform a cold reboot.

1. Disconnect the device from the power supply.
2. Wait for about 20 seconds.
3. Reconnect the device to the power supply.

8.2 Configuration backup and restore

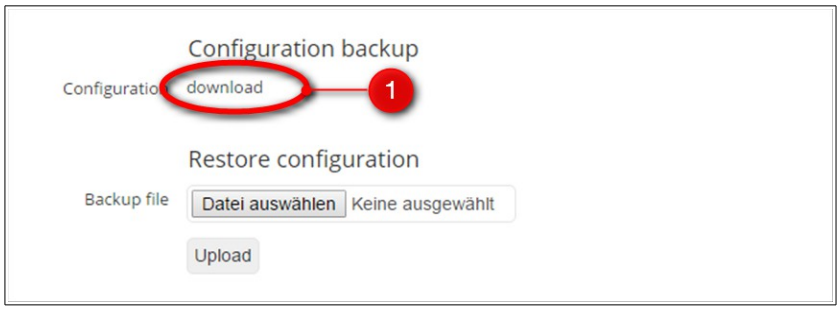
To backup your configuration or to reproduce a configuration on several devices, you can export the configuration and save it away.

Following settings are ignored:

- Manual network settings
- Email accounts and passwords
- API keys for cloud providers

8.2.1 Configuration backup

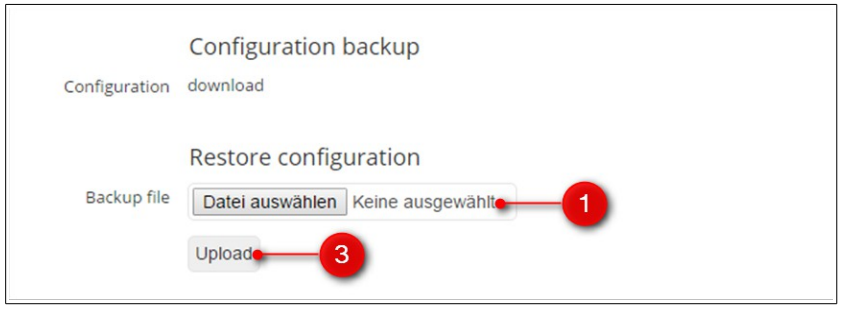
In the configuration back end, open the page *Maintenance / Backup*.



1. In the section Configuration backup click on *Download* next to *Configuration*.
2. Save the file by clicking on *OK*.

8.2.2 Configuration restore

In the configuration back end, open the page *Maintenance / Backup*.



1. In the section *Configuration restore* click on *Choose File* next to *Upload*.
2. Choose the configuration backup that you want to restore.
3. Click on *Upload*.
4. Restart Querx WLAN, see chapter 8.1 Restart Querx WLAN
5. Finally: Set up clouds, email accounts and users.

⚠	**Information** Please notice, that after a configuration restore a reboot is needed.

8.3 Reset configuration

There are two ways to restore the factory defaults on the device.

8.3.1 Configuration reset via web interface

Configuration resets carried our via Web interface will not reset the host name and the IP configuration.

In the configuration back end, open the page *Maintenance / Reset*.

1. Click on *Configuration reset*.

2. Confirm the reset by clicking on *Yes* on the following page.

8.3.2 Manual configuration reset

In case you cannot log in to Querx WLAN, for example if you have lost the log in data, you can do a manual reset to restore the factory default. For that you will need:

- A ballpoint pen

⚠	**Attention** Do not use a pencil for a manual reset, as its lead could break and damage the device.

1. With the device turned on, press the reset button using the ballpoint pen. This button is just underneath the opening next to the status LED. The status LED blinks red .
2. Hold the button until the blinking stops. Querx WLAN is now rebooted with the factory defaults.

   Manual hardware resets will also reset the device's host name and IP configuration to the factory defaults.

8.4 Firmware-Updates

To extend the functionality of Querx WLAN, egnite occasionally provides new firmware images. If needed, they can be installed on the device and afterward be activated.

There are two slots to hold firmware images. If you activate one of those images, they are transferred into the internal memory and will be booted when the device is restarted.

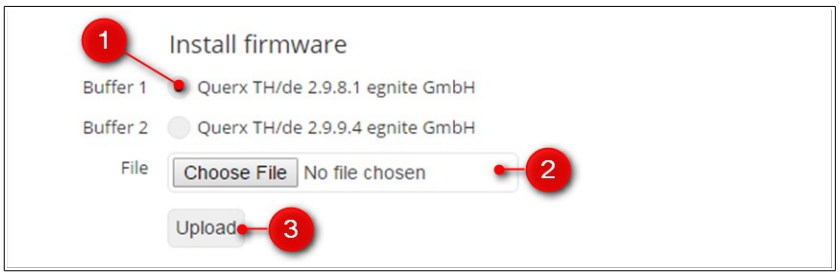
8.4.1 Install firmware image

In the configuration back end, open the page *Maintenance / Firmware*.

In the section *Version* you can see the currently running firmware version. If this version is lower than the version that you can find on http://sensors.egnite.de, a firmware update can be sensible.

Install firmware

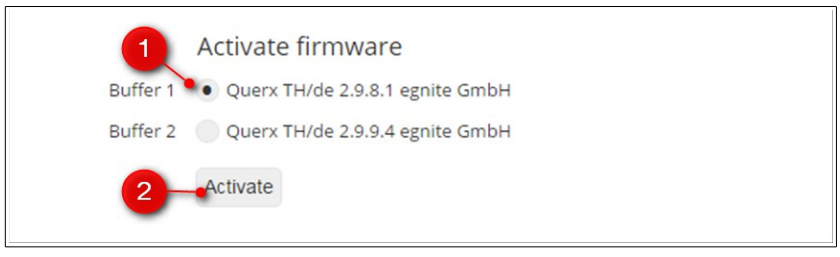
Download the most recent firmware image from the http://sensors.egnite.de. Afterward, open In the configuration back end, open the page *Maintenance / Firmware*.



1. Select the *Buffer*, in which you want to install the new firmware image in the section Upload. This should be the buffer with the lowest firmware version number or an empty buffer.
2. Click on *Choose file* and select the downloaded firmware image.
3. Afterward click on *Upload* to write the image into the selected buffer.

8.4.2 Activate firmware image

After you have uploaded a new firmware version, you need to activate it. In the configuration back end, open the page *Maintenance / Firmware*.



1. In the section *Activation* choose the *Buffer* with the firmware image, which you want to activate.
2. Click on the button *Activate* to write the firmware image into the internal memory.

Afterward the device will reboot with the new firmware.

⚠	**Attention** Do not disconnect the device from the voltage supply while transferring the firmware into the internal memory. This could damage the device

8.4.3 Activate alternative firmware image

If, after changing the active firmware, unexpected problems occur, you can manually activate the other firmware image on the device. To do that you will need:

- **A ballpoint pen**

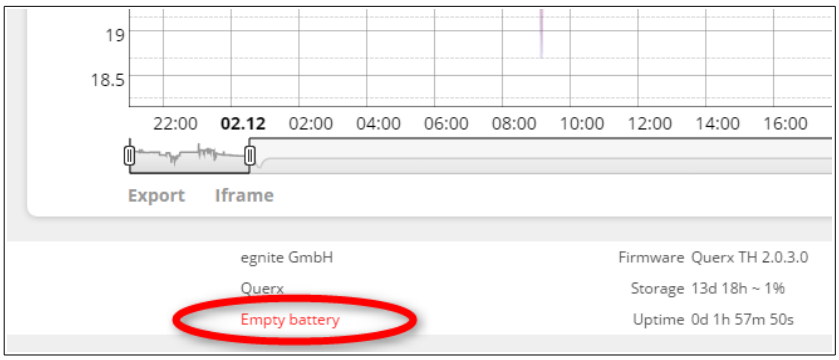
⚠	**Attention** Do not use a pencil for a manual reset, as its lead could break and damage the device.

1. Disconnect the device from the power supply.
2. Press the reset button using the ballpoint pen. You find the button underneath the opening next to the status LED.
3. Hold the button while you reconnect Querx WLAN to the power supply. The device starts blinking. After a couple of seconds the blinking stops and status LED lights red.
4. Now release the button. The alternate firmware image is written into the internal memory and Querx WLAN re-boots.

	Attention After the activation, please wait until the device has rebooted, before you disconnect it from the power supply. If disconnected during the transfer process, the device could be damaged.

8.5 Battery change

To enable the internal clock to operate without voltage supply, Querx TH is equipped with a battery. If its charge has reached a critical level, you will see a notification in the lower left corner of the web interface.



Battery changes can be done on own risk, but we recommend to send the device in for maintenance.

Information

Querx TH is operational without battery. In operation and under usual environmental conditions (temperature at about 23°C), you will not have to change the battery.

If you disconnect the unit from the voltage supply, for example for storing, you need change the battery once every 5 years.

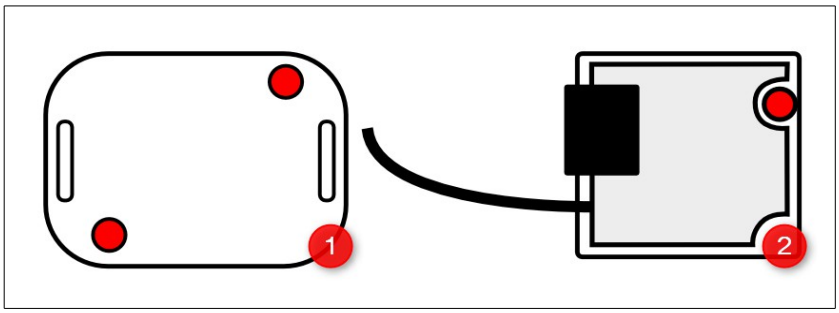
To change the battery you need

- Two Phillips screw drivers, size PH0 and PH1
- A battery, type: Renata CR1225

Attention

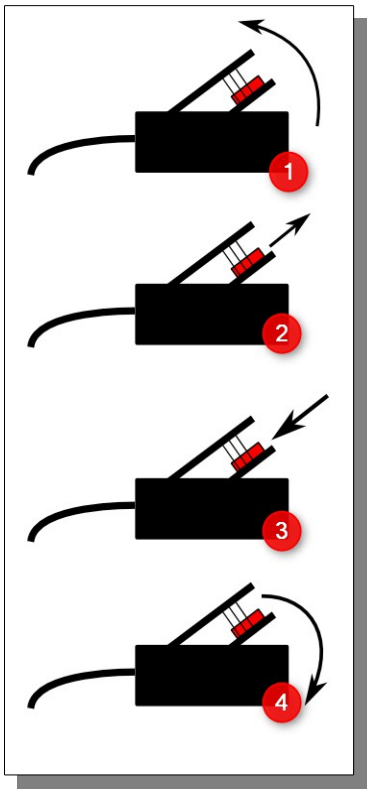
Please avoid getting in touch with any contacts when changing the battery. The device could suffer from damages caused by electrostatic discharge.

8.5.1 Opening the enclosing



1. Loosen both screws at the bottom side of the unit, marked red in the image above.
2. Inside the device is another screw that you need to loosen. This is also marked red in the image above.

8.5.2 Changing the battery



1. Carefully lift the board at the side opposing the sensor cable.
2. Use the screw driver to push the old battery out of its socket from behind.
3. Insert the new battery into the socket. If needed, gently push it with the screw driver.
4. Place the board back into the enclosing.
5. Tighten the screw inside of the enclosing, as well as both screws at the bottom side of device.

8.6 Troubleshooting

Problem	Action to take	Chapter
No network connection	Perform a manual network configuration. Check if there are problems with your network. Maybe ask your network administrator	2.7
Querx WLAN reacts very slow	In the configuration back end, open the page. *Maintenance / Firmware* If the value for *Memory usage* is bigger than 70%, close some browser windows showing Querx WLAN's web interface.	
Querx WLAN show strange measuring values	Check if the sensor cable is connected properly.	
Log in data unknown	Reset system configuration.	8.3
Unknown network configuration	Perform a manual network configuration	2.7
	Or: Reset the system configuration	8.3
NTP / Email / Cloud do not work	Check if you have provided a valid DNS server. Reboot system afterward.	2.7
II need to log in every couple of seconds	Increase the value for a *Session timeout*.	4.3
After a firmware update Querx WLAN doesn't work as expected	If there is another firmware image available on the system, reactivate it.	8.4.3

If you have questions which are not discussed in this manual, please don't hesitate to get in touch with the manufacturer egnite.

You can find the contact information at the end of this manual.

We also suggest to have a look at the tutorial section on http://sensors.egnite.de.

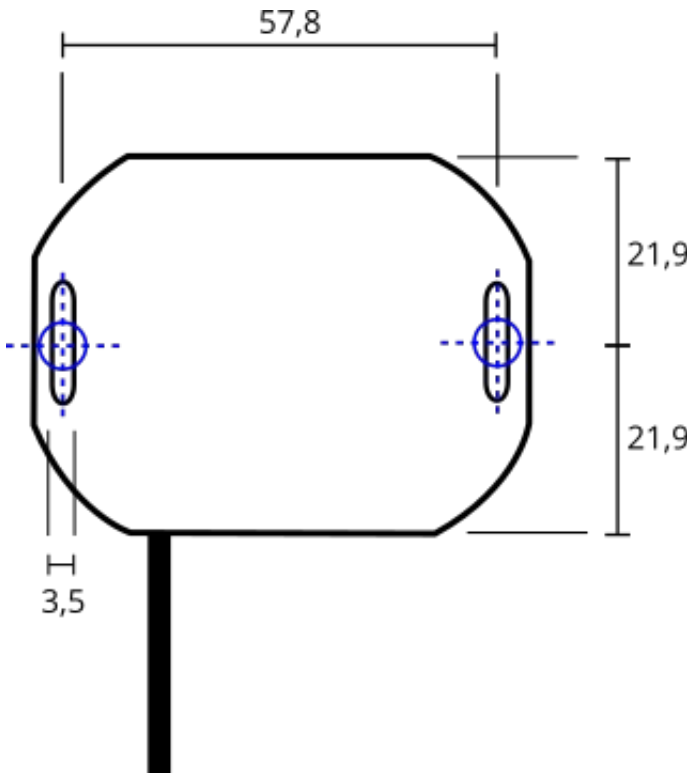
9 Appendix

9.1 Measuring and logging procedure

Once a second, Querx WLAN performs a measurement. This live measurement data can be requested via SNMP, Modbus and the HTTP interface.

Every minute, the data logger records maximum, minimum and average values since the last record, together with date and time.

9.2 Drilling template



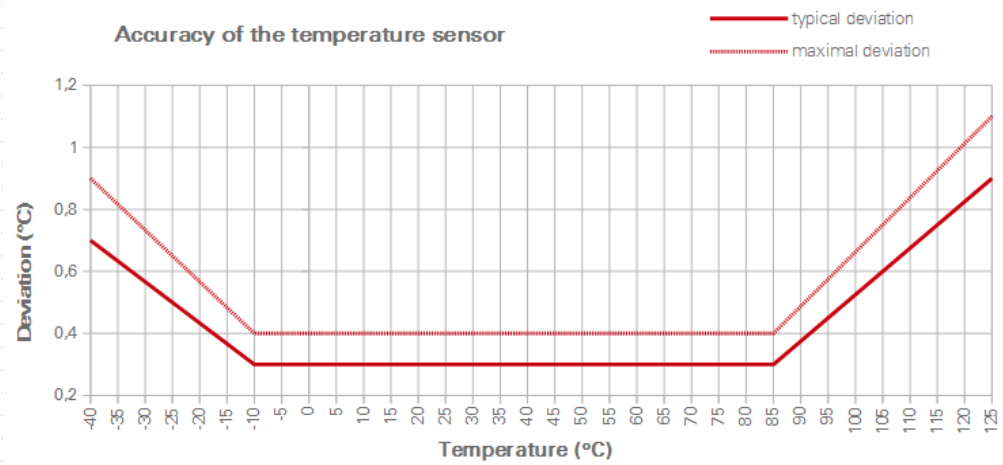
9.3 Specifications

9.3.1 Querx WLAN TH

Specifications	
Measuring range temperature	-40 °C to 85 °C -40 °F to 185 °F
Accuracy temperature	**±0.4 °C** from -10 °C to 85 °C / **±1.0 °C** from -40 °C to -10 °C **±0.7 °F** from 14 °F to 185 °F / **±1.8 °F** from -40 °F to 14 °F
Resolution temperature	0.1 °C / 0.2 °F
Long term stability	≤ 0,01 °C / Jahr
Messbereich Feuchte	0 % bis 95 % rF
Accuracy humidity	**±2% rH** from 0 % bis 80 % RH at 30 °C (86 °F) **±4% rH** from 80 % to 95 % RH at 30 °C (86 °F)
Resolution humidity	1 % rFH
Long-term stability humidity	≤ 0,25 / year
Humidity sensor	CMOS IC with polymide film
Calibration	By factory, DakkS callibration certificates available
Sensor heating	Integrated
Ethernet	10/100 Mbit RJ45, HP Auto-MDIX Static or dynamic (DHCP client) IP
WLAN	2.4 GHz IEEE 802.11b/g/n
WLAN security	WEP, WPA, WPA2
System	Nut/OS 5
Firmware updates	Over web interface, rescue function
Data logger capacity	At least 7.5 years internal (4,000,000 records)
Protocals	HTTP, SMTP, DHCP, SNTP, Syslog, SNMP, Modbus/TCP Nut/Discovery, XML, JSON and CSV over HTTP
Web interface	Password protection, chart, Live Update, HTML5, CSS3, JSON and SVG, User Management (3 Users / 3 Groups)
Email	Up to 4 receipients over to SNMP accounts
SNMP	SNMPv1 Agent and Traps
Status LED	RGB
Date / time	Battery backed real-time clock with SNTP update
Power supply	5 V DC ... 5,5 V DC
Consumption	Typical 200 mA 1 W / Max. 300 mA 1,5 W
Environment	
Operating conditions	40 °C to 85 °C, max. 95 %rH -40 °F to 185 °F, max. 95 %rH
Storage conditions	-40 °C to 85 °C, max. 95 %rH -40 °F to 185 °F, max. 95 %rH
Mechanical data	
Housing material	ABS thermoplastic
Housing color	Black RAL 9011
Housing dimensions	66.3 mm x 50.0 mm x 20.0 mm 2.61 in x 1.97 in x 0.79 in
Length sensing cable	340 mm / 13.4 in
Weight	63 g / 0.14 lb
Connector	RJ45 (Ethernet), Micro USB
Mounting	Wall mounting
Conformity	
European Union	CE
UL, USA / Kanada	UL94V-0
Protection marking	IP20

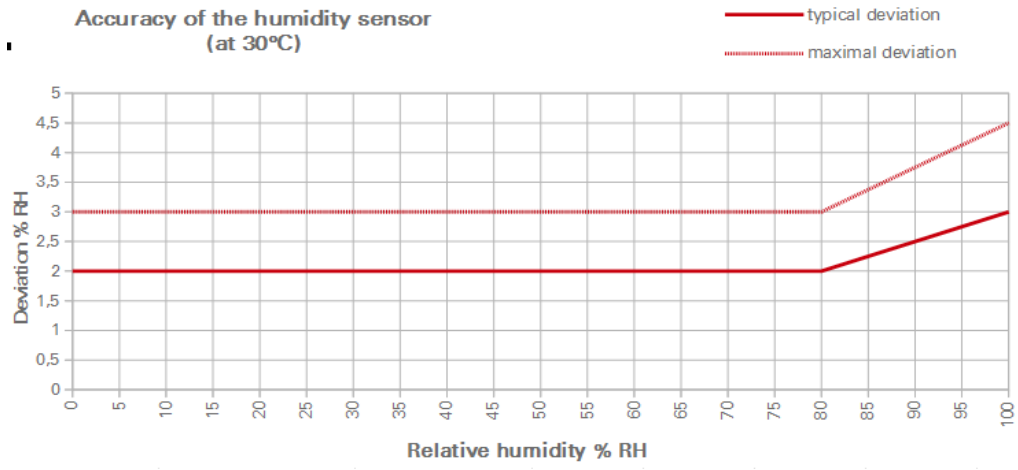
9.3.1.1 Temperature sensor

	Measurement range	Typical	Maximum	Unit
Accuracy	-10 – 85	± 0,3	± 0,4	°C
	-40 – 100	Refer to image below		°C
Long term stability		≤ 0,01		°C / year


Accuracy of the temperature sensor
typical deviation
maximal deviation
Deviation (°C)
1,2
1
0,8
0,6
0,4
0,2
-40 -35 -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125
Temperature (°C)

9.3.1.2 Humidity sensor

	Measurment range	Typical	Maximum	Unit
Genauigkeit	0 – 80	± 2	± 3	%
	80 – 100	Refer to image below		%
Langzeitstabilität		≤ 0,25		% / year



9.3.2 Error of measurement after exposure to extreme circumstances

The capacitive humidity sensor is consists from a thin polymeric film, which is placed between two electrodes. Depending on the humidity, the polymeric material absorbs and emits the water contained in the ambient air. In accordance, the dielectric properties are changing and therefor the capacity of the sensor. This leads to following advantages:

- fast response times
- large measurement range with almost linear characteristics
- high accuracy and long term stability

If the sensors are exposed to extreme environmental conditions like very high temperature, drought or moistness, the sensing film can get to dry or to wet. This leads to a temporary decrease of accuracy for the humidity senor and the calculated dew point.

9.3.2.1 Calculation of the dew point

The dew point is calculated from currently measured values for temperature and humidity, according to the following formula:

$$T_{DC} = (T_C - (14.55 + 0.114 * T_C) * (1 - (0,01 * RH)) - ((2.5 + 0.007 * T_C) * (1 - (0,01 * RH)))^3 - (15.9 + 0.11 * T_C) * (1 - (0.01 * RH))^{14})$$

Reference: H. Dean Parry, 1969: "The semiautomatic computation of rawinsondes", *Technical memorandum WBTM EDL 10, U.S. Department of Commerce, Environmental Science Services Administration*, Weather Bureau, Silver Spring, MD (October), Pg. 9 and ii-4, line 460.

Please keep in mind, that the accuracy for the dew point is depending on the accuracy for temperature and humidity.

9.3.3 Querx WLAN PT100 / PT100

Specifications	
Measuring range	Sensor dependent -200°C to 750°C / -328°F to 1382°F
Accuracy	Sensor dependent 0,5 °C / 0.9 °F
Resolution	0,1 °C / 0.2 °F
Update time	1 second
Pt100/Pt1000-connector	2-, 3- and 4-wire
Calibration	DAkkS calibration certificate available
Ethernet	10/100 Mbit RJ45, HP Auto-MDIX Static or dynamic (DHCP client) IP
WLAN	2.4 GHz IEEE 802.11b/g/n
WLAN security	WEP, WPA, WPA2
System	Nut/OS 5
Firmware updates	Over web interface, rescue function
Datenspeicherkapazität	At least 7,5 years (4,000,000 records)
Protocols	HTTP, SMTP, DHCP, SNTP, Syslog, SNMP, Modbus/TCP Nut/Discovery, XML, JSON and CSV over HTTP
Web interface	Password protection, chart, live update, HTML5, CSS3, JSON and SVG, User Management (3 Users / 3 Groups)
Email	Up to 4 recipients over 2 SMTP accounts
SNMP	SNMPv1 Agent and Traps
Status LED	RGB
Date / Time	Battery backed real-time clock with SNTP update
Voltage supply	5 V DC ... 5,5 VDC over USB
Consumption	Typical 200 mA 1 W / Max. 300 mA 1,5 W
Environment	
Operating conditions	-40 °C to 85 °C, max. 95 % rH -40 °F to 185 °F, max. 95 % rH
Storage conditions	-40 °C to 85 °C, max. 95 % rH -40 °F to 185 °F, max. 95 %rRH
Mechanical data	
Housing material	ABS thermoplastic
Housing color	Black RAL 9011
Housing dimensions	56,3 mm x 21 mm x 40 mm plus sensing cable 2.2 in x 1.6 in x 0.8 in plus sensing cable
Length Senssing cable	340 mm / 13.8 in
Weight	35 g / 0.14 lb
Connector	RJ45 (Ethernet), Micro USB
Mounting	Wall mounting
Konformität	
European Union	CE
UL, USA / Kanada	UL94V-0
Protection mark	IP20

9.4 Conformity

Querx WLAN complies with following standards and directives

Immunity:

- EN 61326-1:2013 Class A
- EN 61000-4-2:2009
- EN 61000-4-3:2011
- EN 61000-4-4:2013
- EN 61000-4-6:2009
- EN 61000-4-8:2010

Emmission:

- EN 61326-1:2013 Klasse B
- EN 55011:2011

ETSI:

- EN300 328, Ver. 1.8.1
- EN301.489 – 17

RoHS:

- EU Directive 2011/65/EU

The declaration of compliance can be requested from the manufacturer.

9.5 Calibration of sensors

Querx WLAN TH's integrated sensors are calibrated by factory.

For Querx WLAN TH, Querx WLAN PT100 and Querx WLANPT1000 are additional calibration certificates available. These certificates are issued by our Dakks accredited partner laboratory and suitable for quality management.

More information on different calibrating options are available on http://sensors.egnite.de and http://shop.egnite.de.

9.6 Modbus Registers

Read Registers			
Address	**Offset**	**Format**	**Content**
30011	10	int16	Temperature Celsius * 10
30012	11	int16	Relative humidity % (Querx WLAN TH)
30013	12	int16	Temperature Fahrenheit * 10
30014	13	int16	Temperature Kelvin * 10
30015	14	int16	Dew point Celsius * 10 (Querx WLAN TH)
30016	15	int16	Dew point Fahrenheit * 10 (Querx WLAN TH)
30017	16	int16	Dew point Kelvin * 10 (Querx WLAN TH)

Holding Registers			
Address	**Offset**	**Format**	**Content**
40021	20	int16	Lower limit temperature in Celsius * 10
40022	21	int16	Upper limit temperature in Celsius * 10
40023	22	int16	Dead-band temperature in Kelvin / Celsius * 10
40024	23	int16	Lower limit temperature in Fahrenheit * 10
40025	24	int16	Upper limit temperature in Fahrenheit * 10
40026	25	int16	Dead-band temperature in Fahrenheit * 10
40027	26	int16	Lower limit temperature in Kelvin * 10
40028	27	int16	Upper limit temperature in Kelvin * 10
40031	30	int16	Lower limit humidity in % (Querx WLAN TH)
40032	31	int16	Upper limit humidity in % (Querx WLAN TH)
40033	32	int16	Dead-band for humidity (Querx WLAN TH)

9.7 SNMP Object Identifiers

OID	Description
1.3.6.1.4.1.3444.1.14.1.2.1.5.1	Temperature sensor
1.3.6.1.4.1.3444.1.14.1.2.1.5.2	Humidity sensor (Querx WLAN TH)
1.3.6.1.4.1.3444.1.14.1.2.1.5.3	Calculated dew point (Querx WLAN TH)
1.3.6.1.4.1.3444.1.14.2.0.101	Trap code for normal state
1.3.6.1.4.1.3444.1.14.2.0.102	Trap code for alarm state
The complete MIB is on the device and can be downloaded from the *Interfaces / SNMP* page in the configuration back end.	

9.8 Export data format

Querx WLAN supports the export of acquired data in three formats

- **CSV**
  This data format can be used with common spread sheet software
- **XML**
  This data format can be used with individual applications
- **JSON**
  JSON is a JavaScript based data format, espacially interesting for Internet-of-Things applications

9.9 Technical support

If you encounter problems with your device, we are looking forward to help you! You can make our work much easier, if you keep following information available

- Name and model number of the device
- Serial number or MAC address
- Curretly running firmware version
- If available: Date of purches and reseller.

Also, you can find a tutorial on how to troubleshooting using syslog on http://sensors.egnite.de. Please work through this instructions and send us the recorded log files.

9.10 Notes on Storage

Do now store the device in polyethylene bags. Fumigation can damage the sensor. Bleaching agents, hydrogen peroxide and ammonia are dangerous as well.

9.11 Proper Disposal

The unit contains electrical components and a battery and my not be disposed in the garbage. Please dispose the device according to legislation in your country.

9.12 Manufacturer and Contact

egnite GmbH

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